ORDER NO. DAD83120046C9

Service Manual

Direct Drive Automatic Turntable System

SL-D4/(K)

[E], [EK], [XL], [EG],
[EB], [EH], [EF], [Ei], [EC],
[XA], [XM], [PA], [PE], [PC]

*** The colors of the model include silver and black.**
*** The black type model is provided with (K) in the Service Manual.**

Areas

- * [E] is available in Switzerland and Scandinavia.
- * [EK] is available in United Kingdom.
- * [XL] is available in Australia.
- * [EG] is available in F.R. Germany.
- * [EB] is available in Belgium.
- * [EH] is available in Holland.
- * [EF] is available in France.
- * [Ei] is available in Italy.
- * [EC] is available in Czechoslovakia.
- * [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- * [XM] is available in Central South America.
- * [PA] is available in far East PX.
- * [PE] is available in European Military.
- * [PC] is available in European Audio Club.

T4P is the standard for plug-in-connector type.
Products carrying this mark are interchangeable and adaptable among each other.

English

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

■ General

Power supply: For Australia: 240V AC, 50Hz
For Continental Europe:
220V AC, 50Hz
For others:
~110-120/220-240V, 50 or 60 Hz

Power consumption: 9 W (For Australia)
7 W (For Continental Europe)
8 W (For others)

Dimensions:
(W x H x D) 31.5 x 8.8 x 31.5 cm
(12-1/2" x 3-1/2" x 12-1/2")
31.5 x 39 x 31.5 cm
(12-1/2" x 15-23/64" x 12-1/2")
(Maximum height when top (dust cover) is open.)

Weight: 3.7 kg (8.2 lb.)

■ Turntable section

Type: Automatic turntable
Auto start
Auto return
Auto stop
Repeat play
Record presence detection

Dirve method: Direct drive
Motor: Brushless DC motor
Turntable platter: Aluminum die-cast
Diameter 30 cm (12")
Turntable speeds: 33-1/3 rpm and 45 rpm
Wow and flutter: 0.025% WRMS (JIS C5521)
± 0.035% peak
(IEC 98A Weighted)
Rumble: –56 dB (IEC 98A Unweighted)
–78 dB (IEC 98A Weighted)

■ Tonearm section

Type: Dynamic balanced type
Linear tracking tonearm
4-pivot gimbal suspension
Effective length: 10.5 cm (4-1/8")
Tracking error angle: Within ± 0.1°
Effective mass: 9 g (including cartridge)
Resonance frequency: 12 Hz
Tonearm drive motor: DC motor

Technics

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ Cartridge section

Type:	Moving magnet stereo cartridge EPC-P28S (For [PA], [PE] and [PC] areas) EPC-P27S (For others)
Magnet circuit:	All laminated core
Frequency response:	10 Hz ~ 35 kHz 20 Hz ~ 10 kHz ± 1 dB
Output voltage:	2.5 mV at 1 kHz, 5 cm/s. zero to peak lateral velocity (7 mV at 1 kHz, 10 cm/s. zero to peak 45° velocity [DIN 45 500])
Channel separation:	22 dB at 1 kHz
Channel balance:	Within 2 dB at 1 kHz
Recommended load impedance:	47 kΩ ~ 100 kΩ
Compliance (dynamic):	12 x 10^{-6} cm/dyne at 100 Hz
Stylus pressure range:	1.25 ± 0.25 g (12.5 ± 2.5 mN)
Weight:	6.0 g (cartridge only)
Replacement stylus:	EPS-28CS (For [PA], [PE] and [PC] areas) EPS-27CS (For others)

- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
  - ★ 220V (50/60 Hz) for Continental Europe.
  - ★ 240V (50/60 Hz) for Australia.
  - ★ 110V-120V/220V-240V (50/60 Hz) for other areas.
  - ★ [EK], [XA], [XM], [PA], [PE] and [PC] areas are provided with voltage selector

Deutsch

TECHNISCHE DATEN

Änderungen der technischen Daten vorbehalten.
Die angegebenen Gewichts- und Abmessungsdaten sind circa Werte.

■ Allgemeine Daten

Stromversorgung:	220 V, 50/60 Hz Wechselstrom
Leistungsaufnahme:	7 W
Abmessungen: (B x H x T)	31,5 x 8,8 x 31,5 cm 31,5 x 39 x 31,5 cm (Maximale Höhe bei vollständig geöffnetem Gehäuseoberteil)
Gewicht:	3.7 kg

■ Plattenspieler

Typ:	Automatischer Plattenspieler Auto-Start Rückführautomatik Stopp-Automatik Wiederhol-Betrieb Plattenpräsenz-Registrierung
Antrieb:	Direktantrieb
Motor:	Kollektorloser Gleichstrommotor
Plattenteller:	Aluminium-Druckguß Durchmesser 30 cm
Plattenteller-Drehzahlen:	33-1/3 und 45 U/min
Gleichlaufschwankungen:	0,025% WRMS (JIS C5521) ± 0.035% Spitze (IEC 98A bewertet)
Rumpel-Geräusch-spannungsabstand:	–56 dB (IEC 98A unbewertet) –78 dB (IEC 98A bewertet)

■ Tonarm

Typ:	Dynamisch ausbalancierter Tangential-Tonarm mit Kardanaufhängung mit 4-Punkt-Drehlager
Effektive Länge:	10,5 cm
Spurfehlwinkel:	Innerhalb ± 0,1°
Effektive Masse:	9 g (einschließlich Tonabnehmer)
Resonanzfrequenz:	12 Hz
Tonarm-Antriebsmotor:	Gleichstrommotor

■ Tonabnehmer

Typ:	Stereo-Magnet-Tonabnehmer
Magnetkreis:	Ganzlamellenkern
Frequenzgang:	10 Hz bis 35 kHz 20 Hz bis 10 kHz ± 1 dB
Ausgangsspannung:	2,5 mV bei 1 kHz 5 cm/s. Null-zu-Spitze, lateral (7 mV bei 1 kHz 10 cm/s. Null-zu-Spitze, 45° [DIN 45 500])
Kanaltrennung:	22 dB bei 1 kHz
Kanalabweichung:	Innerhalb 2 dB bei 1 kHz
Empfohlene Endimpedanz:	47 kΩ ~ 100 kΩ
Nachgiebigkeit (dynamisch):	12 x 10^{-6} cm/dyn bei 100 Hz
Auflagekraft-Einstellbereich:	1,25 ± 0,25 g (12,5 ± 2,5 mN)
Gewicht:	6 g (nur Tonabnehmer)
Ersatznadel:	EPS-27CS

- Die Stromversorgung für dieses Gerät ist je nach Land verschieden. Die Teile für das Netzteil sind ebenfalls verschieden. Beachten Sie daher den Schaltungsplan und die Ersatzteilliste.
  - ★ (EK)-, (XA)-, (XM)-, (PA)-, (PE)-und (PC)-Modelle sind mit einem Spannungswahlschalter versehen.

CARACTERISTIQUES

Les spécifications sont susceptibles d'être modifiées sans préavis.
Le poids et les dimensions donnés sont approximatifs.

■ Généralités

Alimentation:	Alternatif 220 V, 50/60 Hz
Consommation:	7 W
Dimensions:	31,5 x 8,8 x 31,5 cm
(L x H x P)	31,5 x 39 x 31,5 cm (Hauteur maximum lorsque le dessus (couvercle protègepoussière) est ouvert.)
Poids:	3.7 kg

■ Platine de lecture

Type:	Platine automatique Départ automatique Retour automatique Arrêt automatique Auditon répétée Détection de la présence d'un disque
Système d'entraînement:	Entraînement direct
Moteur:	Moteur C.C. sans balai
Plateau de lecture:	Aluminium moulé sous pression Diamètre 30 cm
Vitesses de la platine:	33-1/3 et 45 t/p.m.
Pleurage et scintillement:	0,025% de valeur efficace (JIS C5521) ± 0,035% de crête (IEC 98A Pondéré)
Ronflement:	−56 dB (IEC 98A Non Pondéré) −78 dB (IEC 98A Pondéré)

■ Bras de lecture

Type:	Bras de lecture d'alignement linéaire de type à équilibre dynamique avec suspension à la cardan à 4 pivots
Longueur effective:	105 mm
Angle d'erreur de piste:	En deçà de ± 0,1°
Masse réelle:	9 g (y compris la cellule pick-up)
Fréquence de résonance:	12 Hz
Moteur d'entraînement du bras de lecture:	Moteur C.C.

■ Cellule pick-up

Type:	Cellule pick-up stéréo à aimant mobile
Circuit magnétique:	Noyau entièrement feuilleté
Réponse en fréquence:	10 Hz à 35 kHz 20 Hz à 10 kHz ± 1 dB
Tension de sortie:	2,5 mV à 1 kHz; 5 cm/s. zero à vitesse latérale de crête (7 mV à 1 kHz; 10 cm/s. zéro à vitesse 45° de crête [DIN 45 000])
Séparation des canaux:	22 dB à 1 kHz
Equilibrage des canaux:	En deçà de 2 dB à 1 kHz
Impédance de charge recommandée:	47 kΩ ∼ 100 kΩ
Elasticité (dynamique):	12 x 10^{-6} cm/dyne à 100 Hz
Plage de la force verticale d'appui:	1,25 ± 0,25 g (12,5 ± 2,5 mN)
Poids:	6 g (cellule seule)
Pointe de lecture de remplacement:	EPS-27CS

- L'alimentation en courant pour cet appareil varie selon les régions. De plus, les pièces utilisées pour l'alimentation en courant sont différentes. Aussi, se référer au schéma de montage et à la liste des piéces de remplacement.
  ★ Les régions (EK), (XA), (XM), (PA), (PE) et (PC) sont fournies avec un sélecteur de tension.

ESPECIFICACIONES

Las especificaciones quedan sujetas a cambios sin aviso previo.
El peso y las dimensiones indicados son aproximados.

■ En general

Alimentación de corriente:	220V AC, 50/60 Hz
Consumo de corriente:	7 W
Dimensiones:	31,5 x 8,8 x 31,5 cm
(Ancho x Alto x Prof.)	31,5 x 39 x 31,5 cm (Altura máxima cuando la parte de arriba (tapa contra el polvo) está abierta.)
Peso:	3.7 kg

■ Sección del plato giratorio

Tipo:	Plato giratorio automático Arranque automático Retorno automático Parada automática Ejecución repetida Detección de presencia de disco
Método de accionamiento:	Accionamiento directo
Motor:	Motor de corriente continua sin escobillas
Platillo del plato giratorio:	Aluminio fundido 30 cm de diámetro
Velocidades del plato giratorio:	33-1/3 y 45 rpm
Ululacione y trémolo:	0,025% WRMS (JIS C5521) ± 0,035% cresta (IEC 98A Ponderado)
Ruido de rodadura:	−56 dB (IEC 98A No ponderado) −78 dB (IEC 98A ponderado)

■ Sección del brazo sonoro

Tipo:	Brazo sonoro de seguimiento lineal de tipo con equilibrio dinámico con suspensión cardánica de 4-pivotes
Longitud efectiva:	10,5 cm
Angulo de error de seguimiento:	Inferiro a ± 0,1° aproxim.
Masa efectiva:	9 g (incluyendo el cartucho)
Frecuencia de resonancia:	12 Hz
Motor de accionamiento del brazo sonoro:	Motor de corriente continua

■ Sección del cartucho

Tipo:	Cartucho estereofónido de imán móvil
Circuito magnético:	Núcleo totalmente laminado
Respuesta de frecuencia:	10 Hz a 35 kHz 20 Hz a 10 kHz ± 1 dB
Voltaje de salida:	2,5 mV a 1 kHz Velocidad lateral de cero a cresta de 5 cm/s. (7 mV a 1 kHz. Velocidad de 45° de cero a cresta de 10 cm/s. [DIN 45 000])
Separación de canales:	22 dB a 1 kHz
Equilibrio de canales:	Inferior a 2 dB a 1 kHz
Impedancia de carga recomendada:	47 kΩ a 100 kΩ
Elasticidad (dinámica):	12 x 10^{-6} cm/dina a 100 Hz
Radio de presión de la aguja:	1,25 ± 0,25 g (12,5 ± 2,5 mN)
Peso:	6 g (cartucho solamente)
Aguja de recambio:	EPS-27CS

- El suministro de energia para esta unidad varia según las áreas. También, las piezas usadas para suministro de energia son diferentes.
  ★ Las áreas (EK), (XA), (XM), (PA), (PE) y (PC) se proveen con selector de voltaje.

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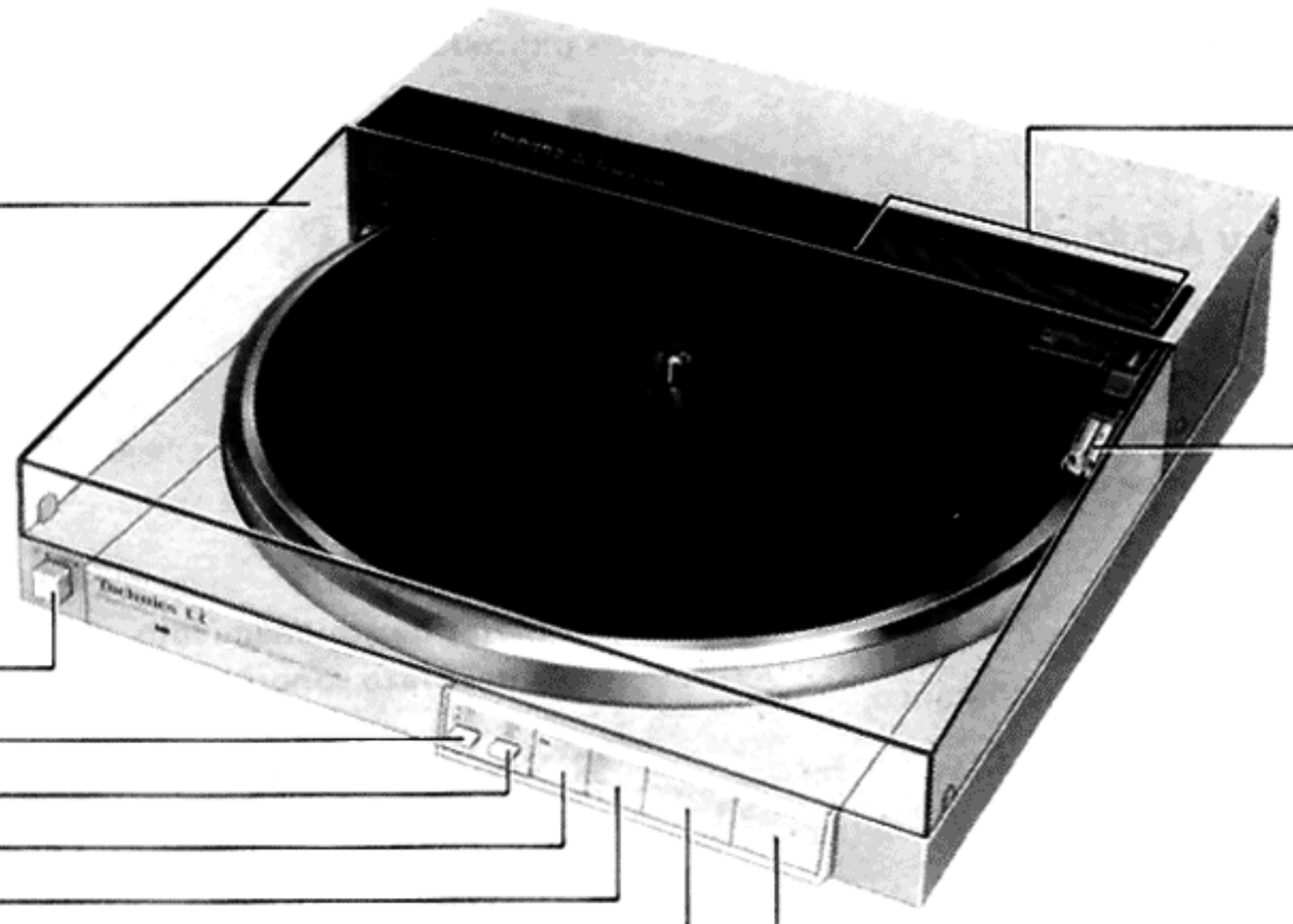
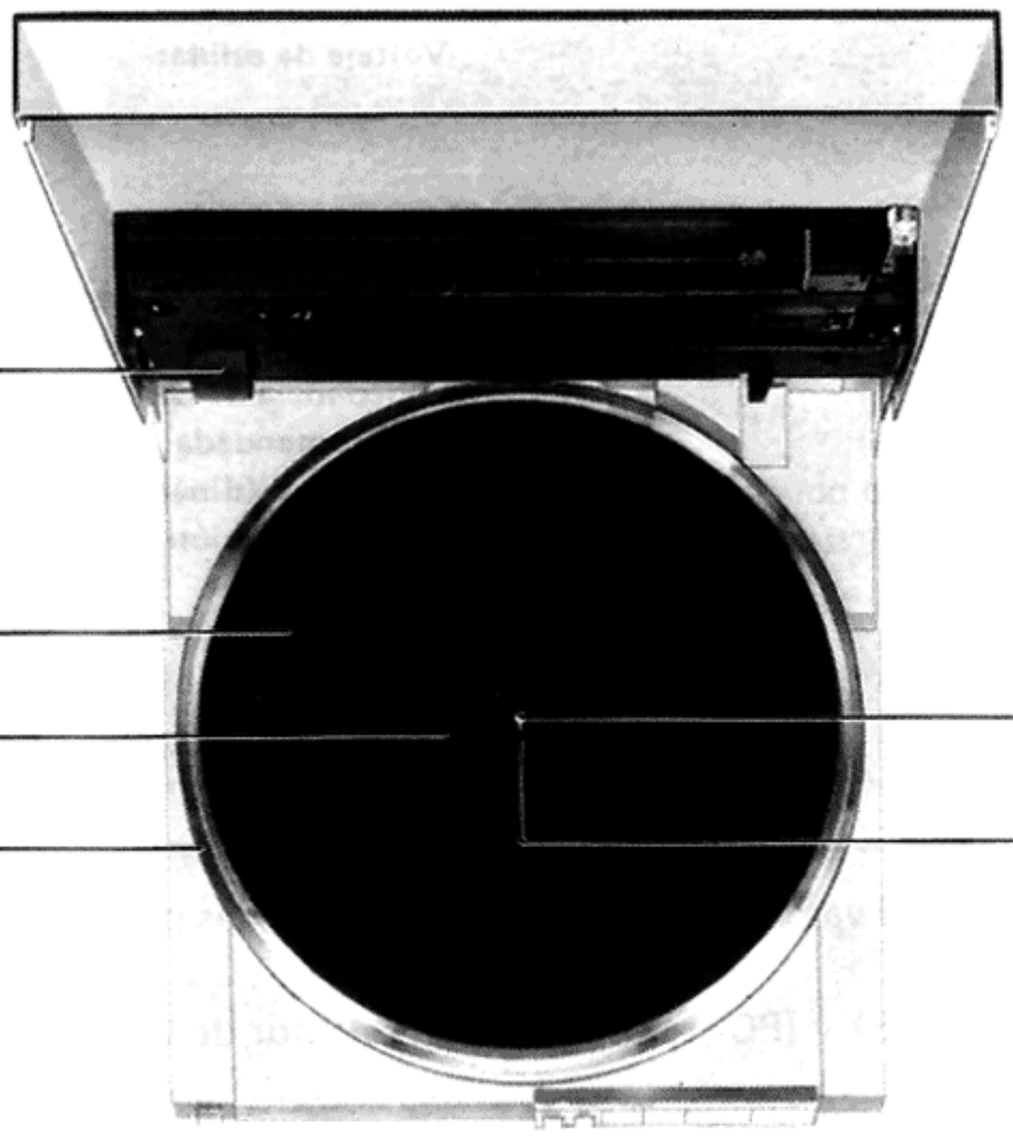
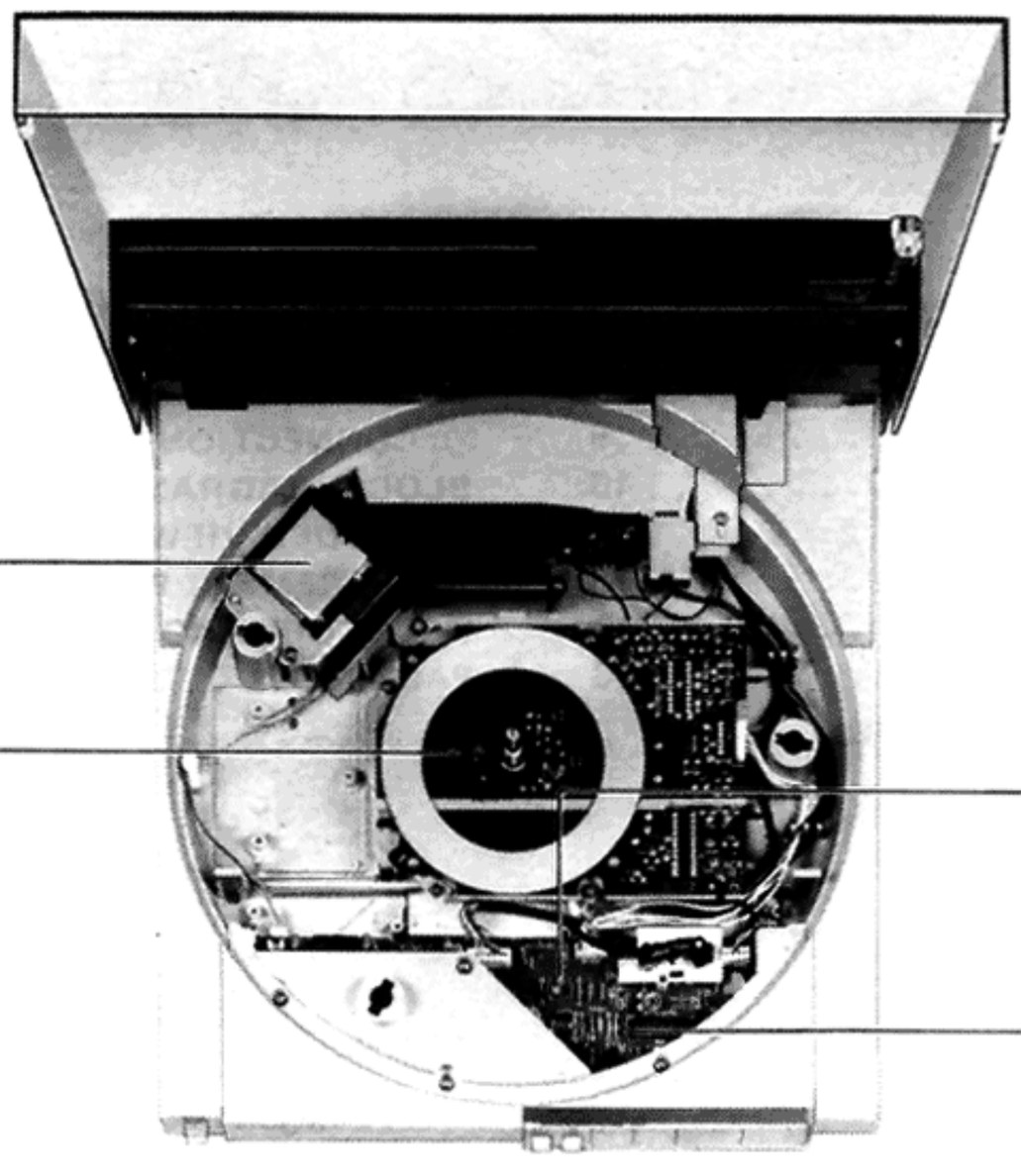
■ LOCATION OF CONTROLS







■ DISASSEMBLY INSTRUCTIONS

• How to remove the cartridge

1. Open the dust cover.
2. Remove the cartridge setscrew (**Fig. 1 : ❶**) and pull out the cartridge in the direction of the arrow.

Note: When attaching the cartridge again, match the tonearm connector with the cartridge pins, then completely insert it and tighten the setscrew.

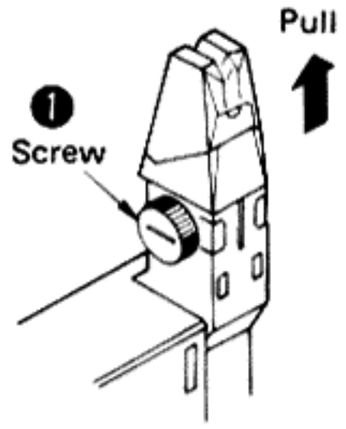


Fig. 1

• How to remove the turntable platter

1. Open the dust cover.
2. Remove the turntable mat and lift the turntable platter. **(Fig. 2)**

Note:

(1) When removing the turntable platter, it is not necessary to remove the 45r.p.m. adaptor.

(2) The turntable platter is tight fitted on to the center spindle. When removing the turntable platter, take care not to give damage to the upper cabinet, arm motor cover and tonearm cover.

• How to remove the 45 r.p.m. adaptor (Fig. 3)

1. Remove the turntable platter. **(Refer to "How to remove the turntable platter".)**
2. Turn the 45r.p.m. adaptor counterclockwise to raise it from the turntable platter surface.
3. Push the claw by the blade screwdriver in the direction of the arrow, then remove the 45r.p.m. adaptor.

Note: When removing the 45r.p.m. adaptor, remove the turntable platter, otherwise the 45r.p.m. adaptor claws will be broken.

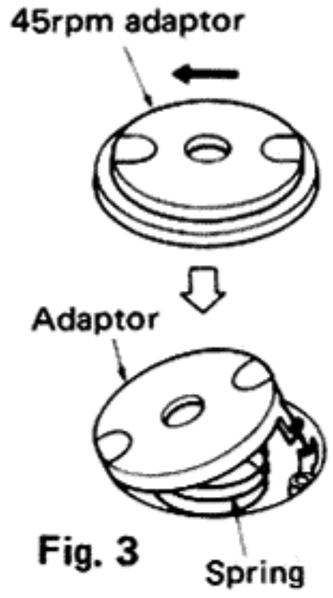


Fig. 3

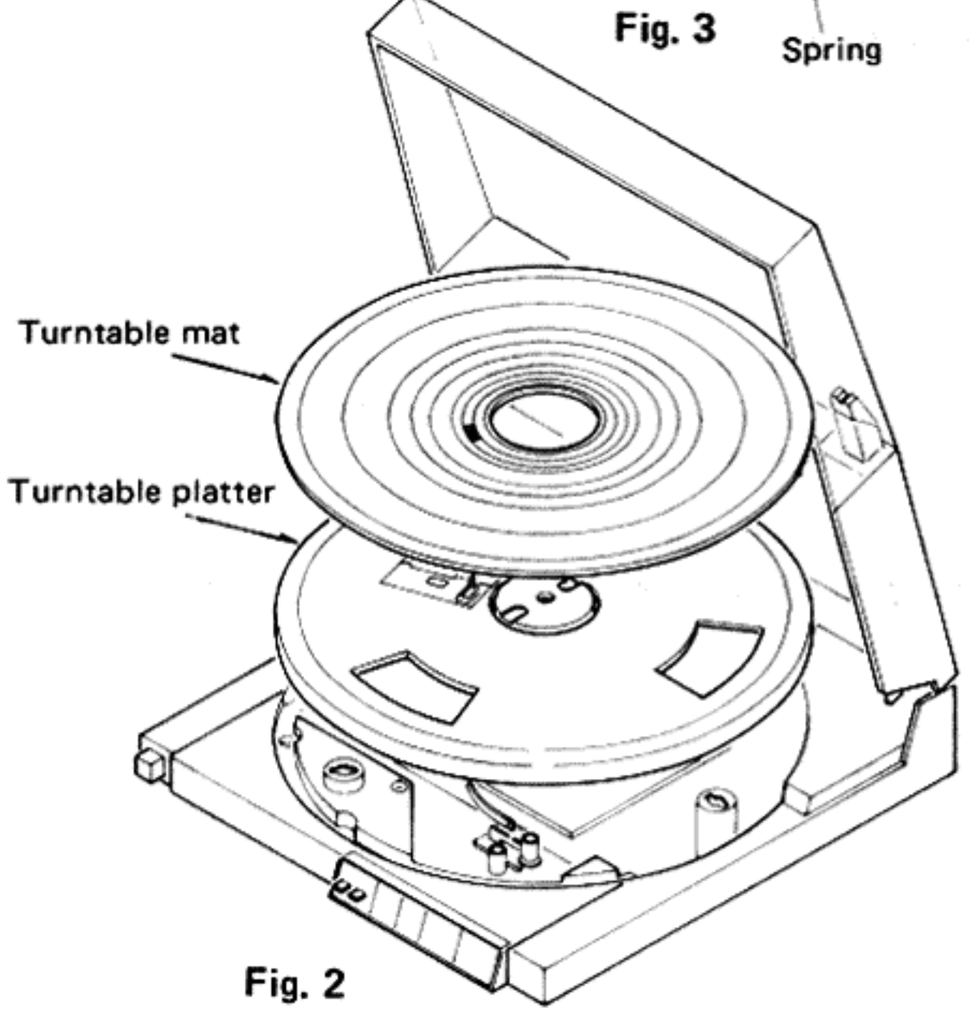


Fig. 2

• How to remove the front cover and operation circuit board

1. Remove the turntable platter. **(Refer to "How to remove the turntable platter".)**
2. Pull out the power switch knob.
3. Remove the lead wires from the lead wire clamper.
4. Pull out the connectors CN1, CN101, CN301 and CN303.
5. Remove the radiator plate setscrew (**Fig. 4 : ❷**) and the 6 front cover setscrews (**Fig. 4 : ❸ ~ ❽**) and then, remove the front cover in the direction of the arrow.
6. Turn over the front cover and remove the operation circuit board setscrews (**Fig. 5 : ❾ ~ ⓬**).
7. Remove the operation circuit board in the direction of the arrows (A ~ B).

Note: When replacing the operation circuit board, set the power switch rod and the spring as shown in **Fig. 5**.

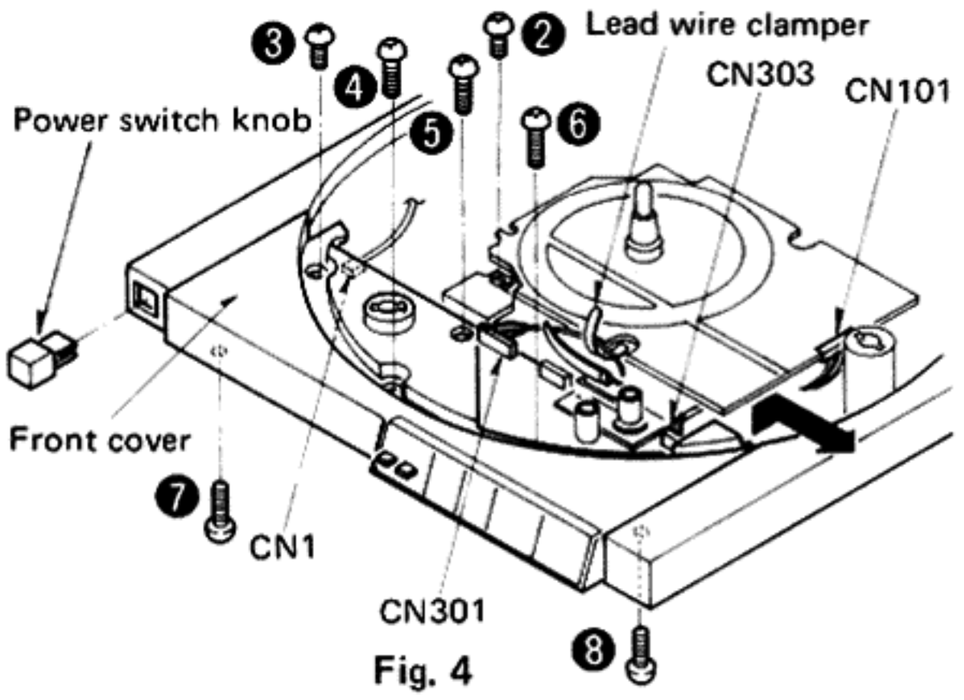


Fig. 4

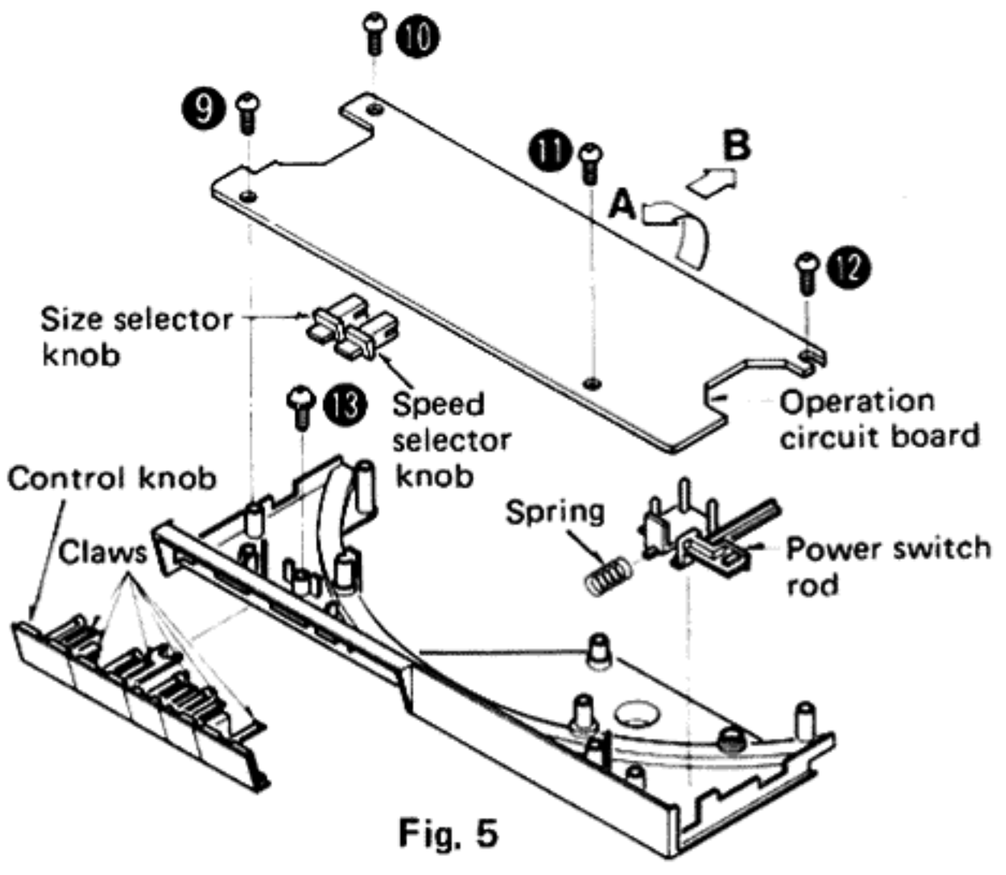


Fig. 5

• How to remove the control knob, size selector knob and speed selector knob

1. Remove the front cover.
2. Loosen the control knob setscrew (**Fig. 5 : ⓭**).
3. Release the 7 control knob claws, then the control knob can be removed.
4. Pull out the size selector knob and speed selector knob from the switches on the operation circuit board.

• How to remove the stator frame and drive circuit board

1. Remove the turntable. **(Refer to "How to remove the turntable platter".)**
2. Remove the 4 stator frame setscrews **(Fig. 6 : ⓮ ~ ⓱)**, then the stator frame with drive cirucit board can be removed.
3. Cut off the stopper by nippers and remove the stopper as shown in **Fig. 7.**
4. Remove the 4 drive circuit board setscrews **(Fig. 6 : ⓲ ~ ㉑)** and the connector CN101.
5. Remove the ground wire setscrew **(Fig. 6 : ㉒)** to separate the stator frame and drive circuit board.

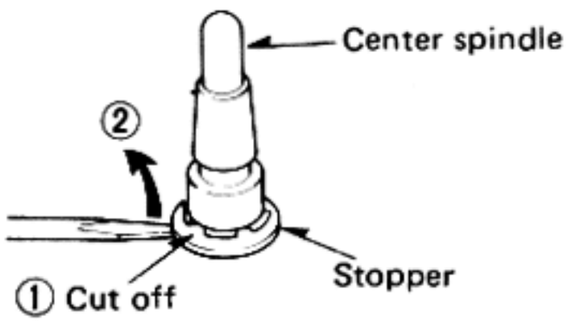


Fig. 7

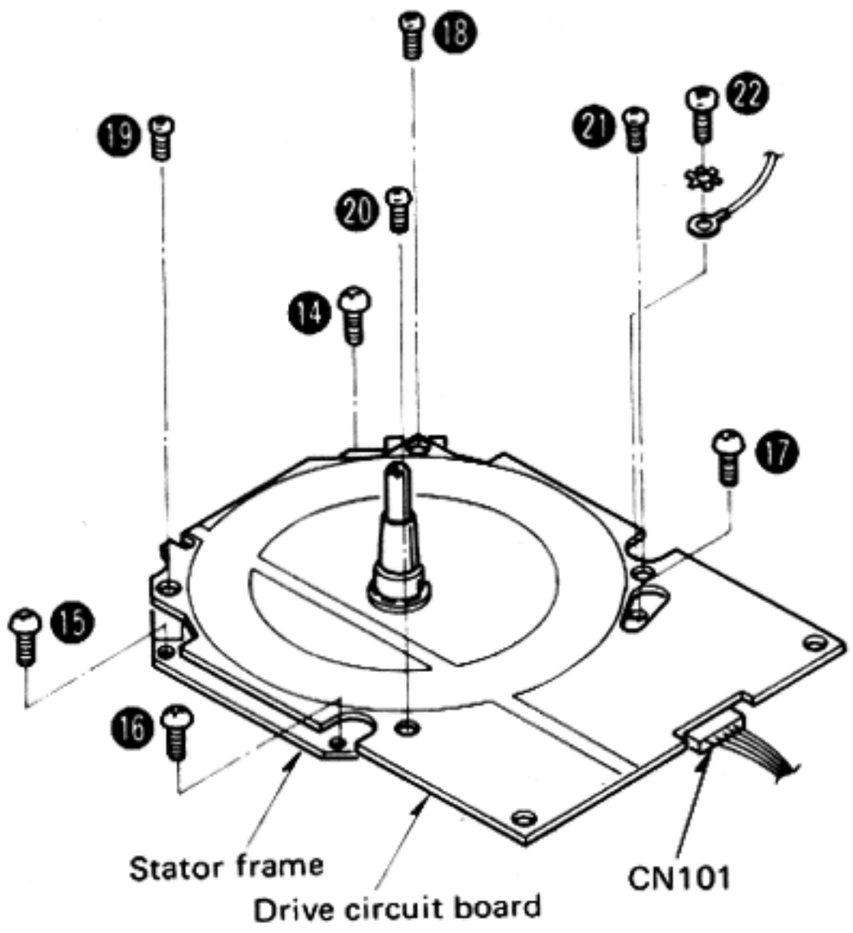


Fig. 6

• How to remove the lead wires cover

1. Remove the turntable platter. **(Refer to "How to remove the turntable platter".)**
2. Remove the lead wires cover setscrew **(Fig. 8 : ㉓)**.
3. Release the 2 claws from bottom of the cabinet, then pull out the lead wires cover in the direction of the arrow. **(Fig. 8).**

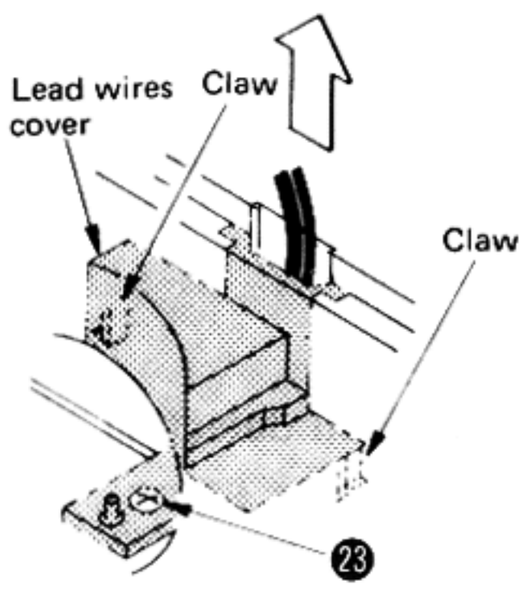


Fig. 8

• How to remove the dust cover

1. Remove the right and left rivets of the dust cover. **(Fig. 9)**
2. Lift the dust cover.

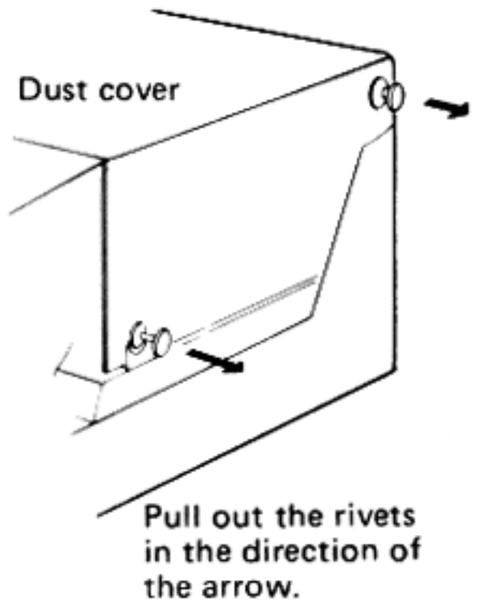


Fig. 9

• How to remove the tonearm

1. Remove the cartridge. **(Refer to "How to remove the cartridge".)**
2. Remove the lead wires cover. **(Refer to "How to remove the lead wires cover".)**
3. Unsolder the 2 lead wires from the output terminal. **(Fig. 10)**
4. Releas the lead wires holder claws and remove the lead wires holder. **(Fig. 11)**
5. Turn the worm gear by finger to move the tonearm inward.
6. Remove the tonearm setscrew **(Fig. 12 : ㉔)**, then the tonearm can be removed.

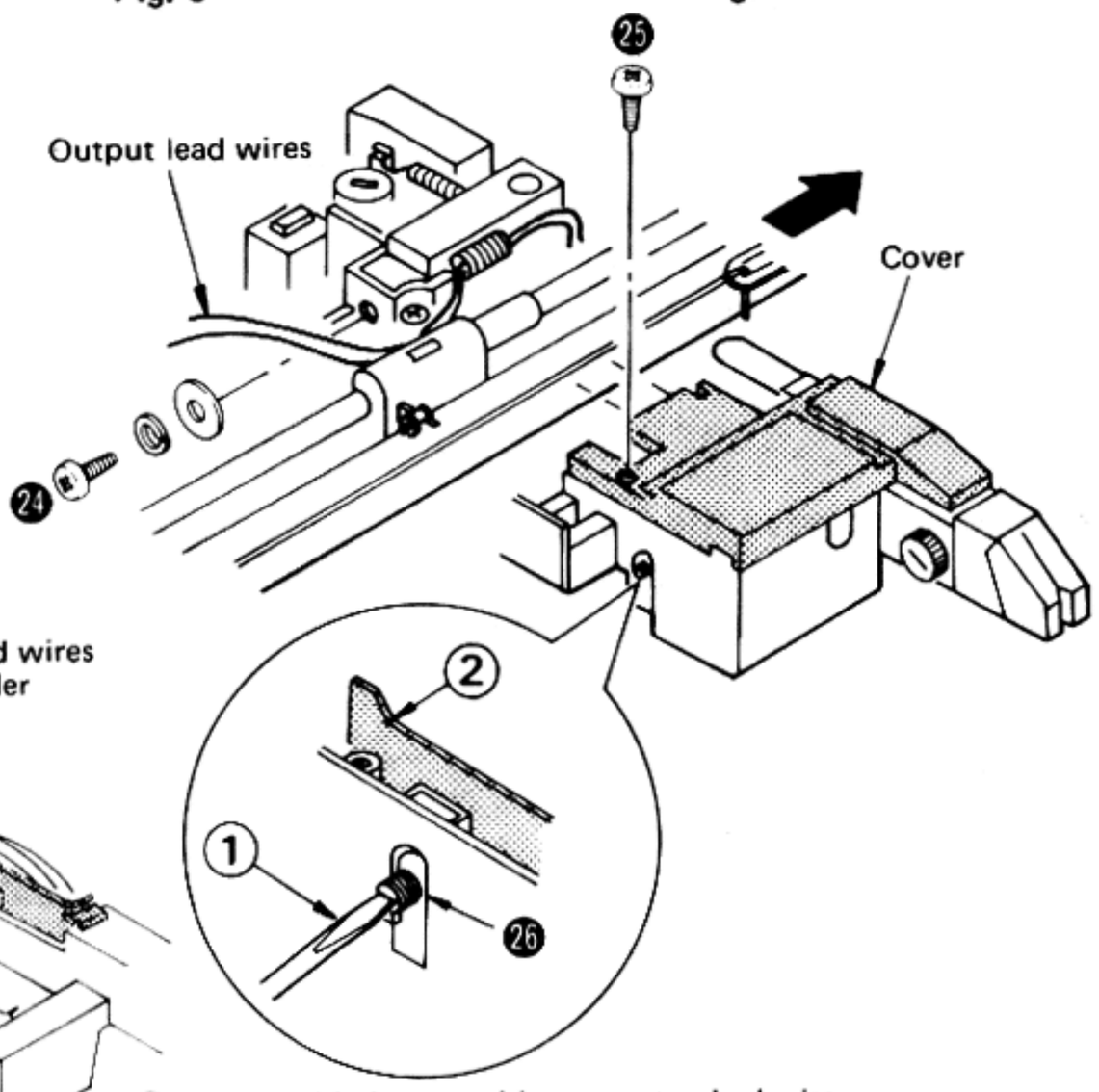


Fig. 12

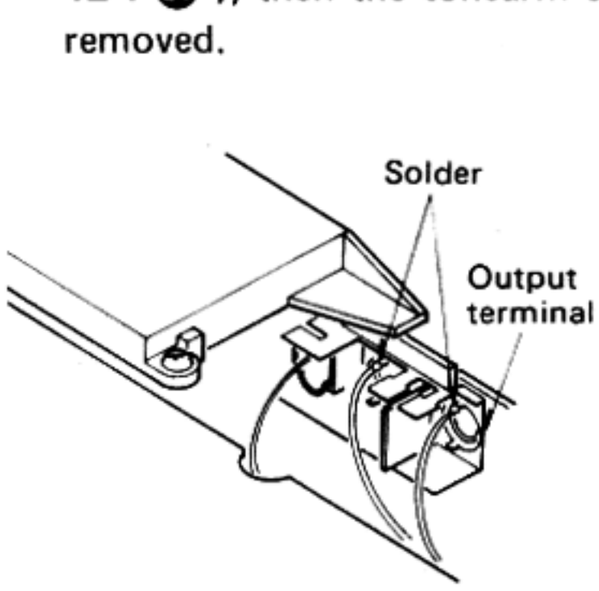


Fig. 10

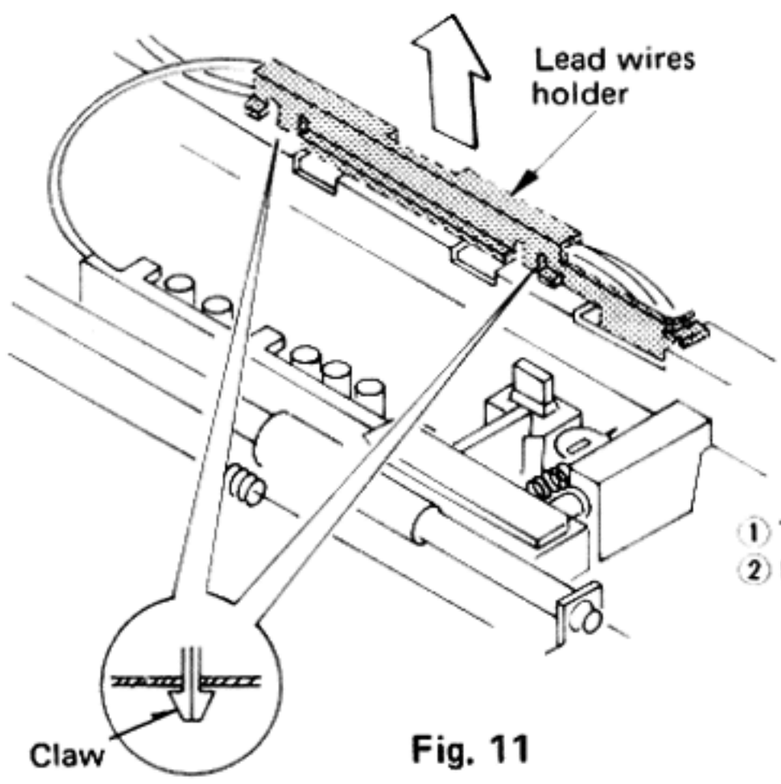


Fig. 11

• How to remove the offset angle detection circuit board

1. Remove the dust cover. **(Refer to "How to remove the dust cover".)**
2. Remove the indicator cover setscrew **(Fig. 12 : ㉕)**, then the indicator cover can be removed.
3. Remove the adjustment screw **(Fig. 12 : ㉖)**, then the offset angel detection circuit board can be removed.

Note: When replacing the offset angle detection circuit board, be sure to adjust the servo gain and offset voltage. **(Refer to the adjustment procedure.)**

• How to remove the cueing plunger

1. Remove the offset angle detection circuit board. **(Refer to "How to remove the offset angle detection circuit board".)**
2. Unsolder the 2 lead wires of the cueing plunger on the offset angle detection circuit board.
3. Remove the cueing plunger setscrew **(Fig. 13 : ㉗)**, then the cueing plunger can be removed.

Note: The cueing plunger must be fitted in the position of **Fig. 14**.

• How to remove the tonearm position detecting circuit board

1. Remove the dust cover. **(Refer to "How to remove the dust cover".)**
2. Remove the tonearm position detecting circuit board setscrew **(Fig. 15 : ㉘)**, then the tonearm position detecting circuit board can be removed.

Note: When fitting the tonearm position detecting circuit board, adjust the clearance between Hall IC and magnet should be **0.8 mm ± 0.2 mm**.
Adjustment procedure as shown in **Fig. 16**.

• How to remove the Hall element

1. Remove the turntable platter.
2. Remove the terminal solder by use of solder sucker.
3. Hold the Hall element with a tweezers and remove it while touching the soldering iron to the terminal. **(Fig. 17)**

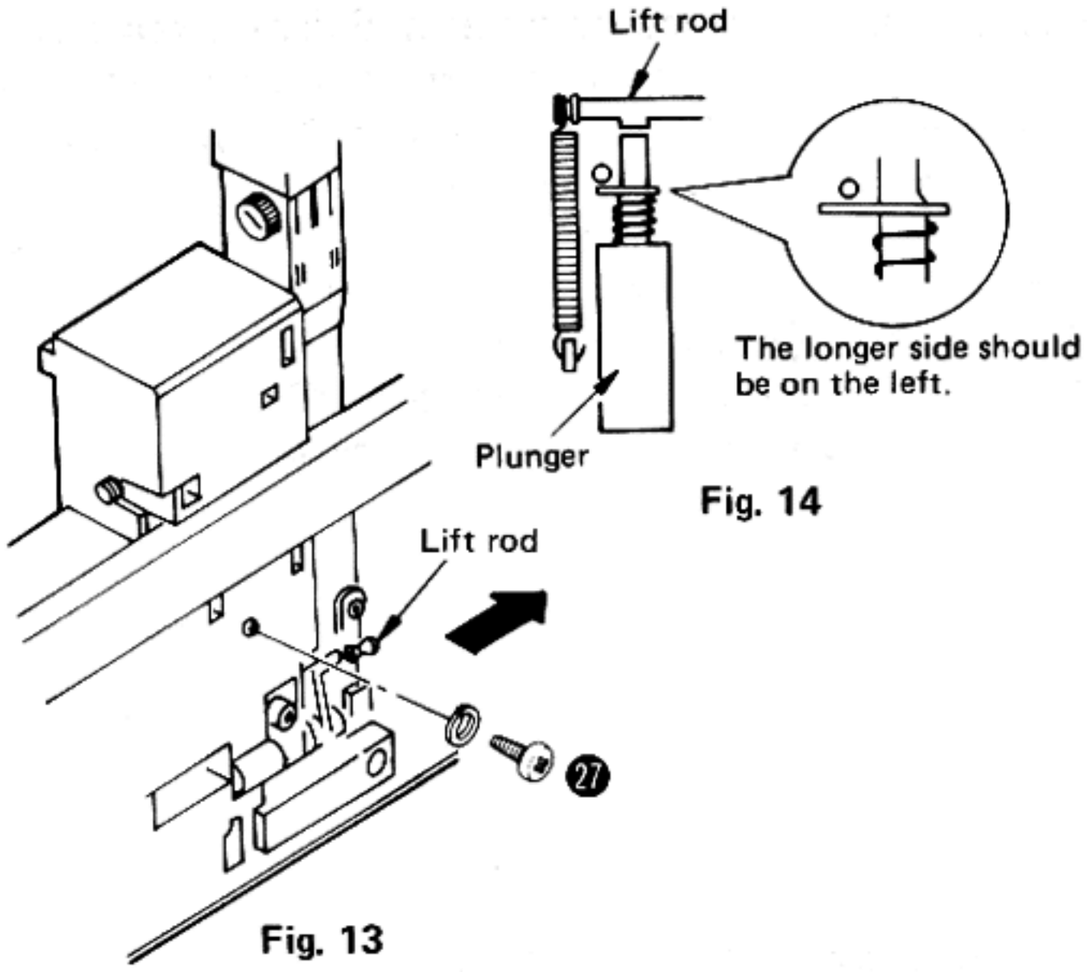


Fig. 14

Fig. 13

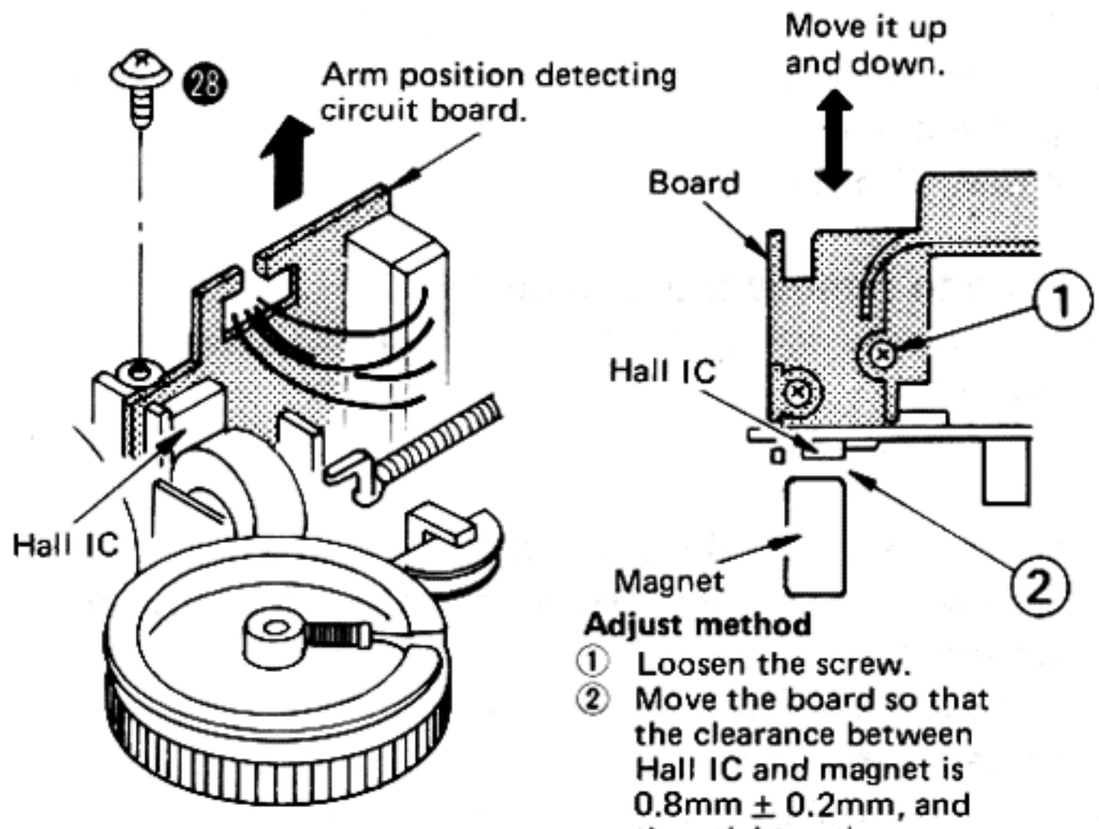


Fig. 15

Fig. 16

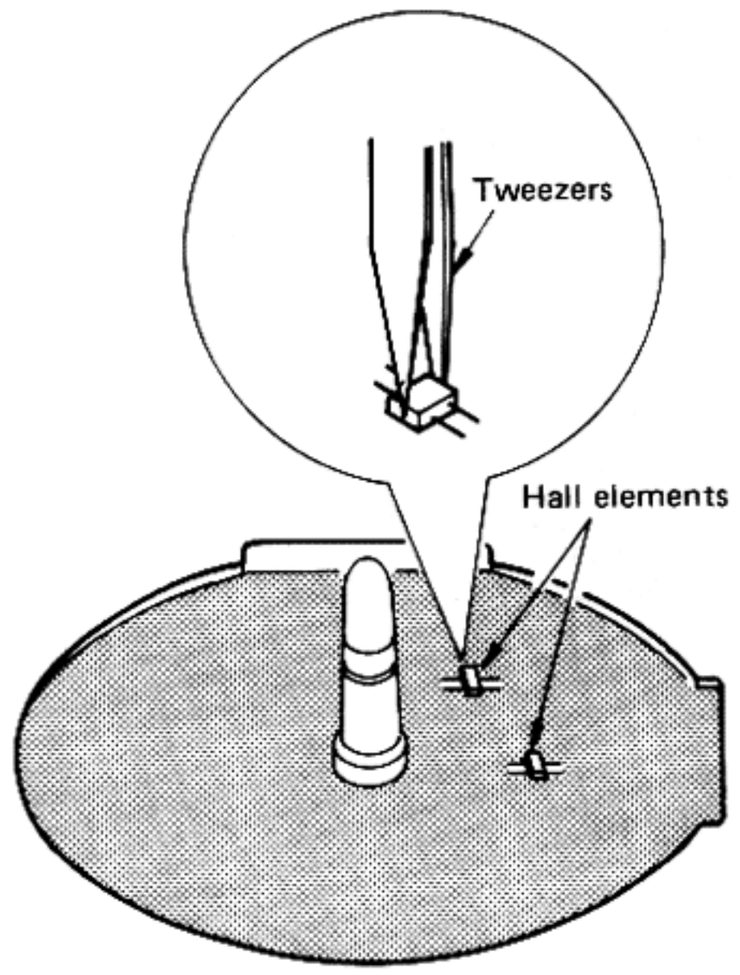


Fig. 17

■ HOW TO SET THE TONEARM DRIVE ROPE

When setting the rope, follow the procedure given below.

1. Remove the dust cover and tonearm cover. **(Refer to "How to remove the dust cover.")**
2. Remove the roller cover. **(Fig. 18)**
3. Set the rope in the order of 1 ~ 5 **(Fig. 18)**
4. Fit the rope connector to the tonearm.
5. Set the roller cover and turn the worm gear by finger to see that the tonearm moves.

Note: The arm drive wheel is not fixed. So, take care not to let is come loose during servicing. (Stop it with C-ring to prevent its removal.)

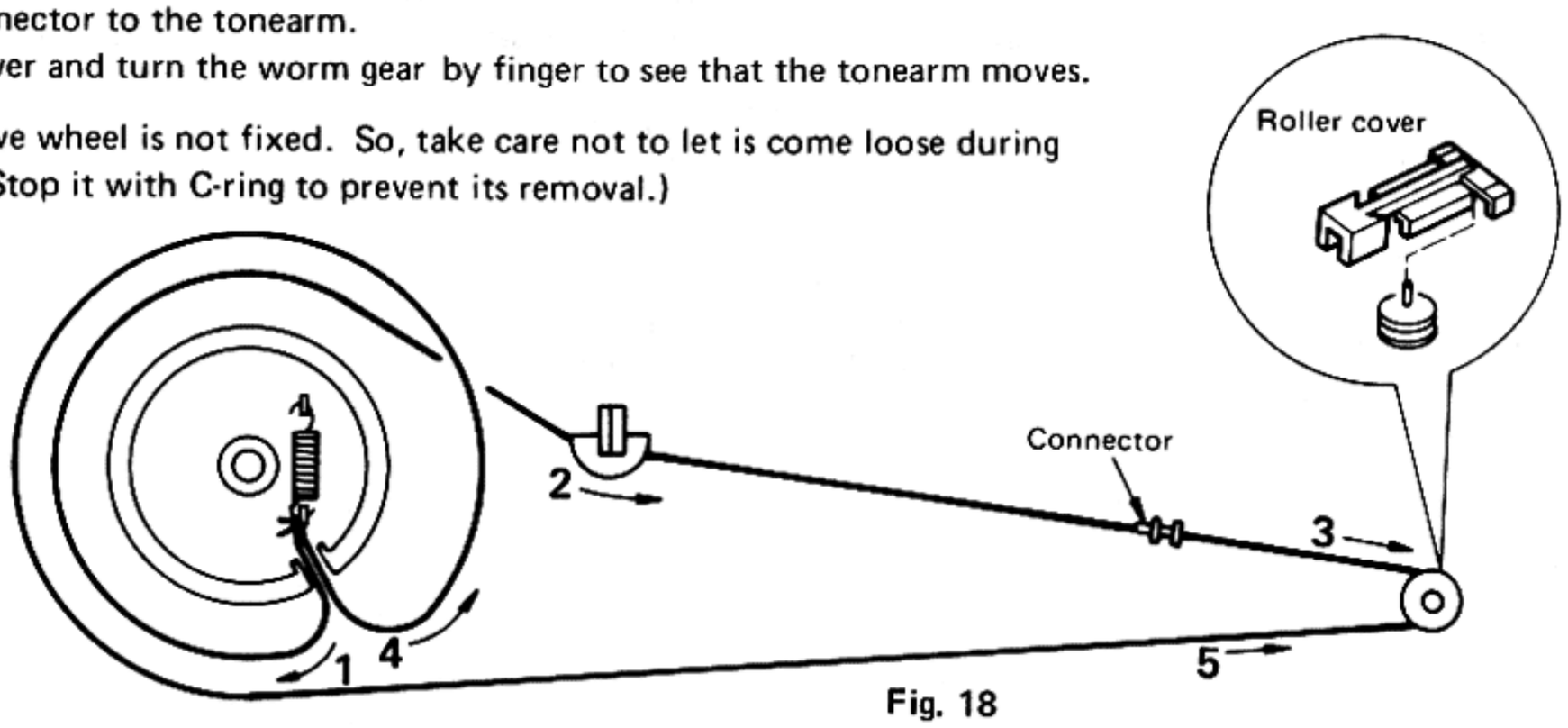


Fig. 18

■ HOW TO REPLACE CHIPS

(Resistor, capacitor and jumper)

- **Removing procedure**

1. Completely remove the solder from both ends of the chip by use of solder suker.
2. Touch the soldering iron to the end of the chip as shown in Fig. 19, then turn the tweezers in the direction of the arrow.

Without color code With color code

Chip resistor

Do not re-use chip resistor or capacitor without color cord.

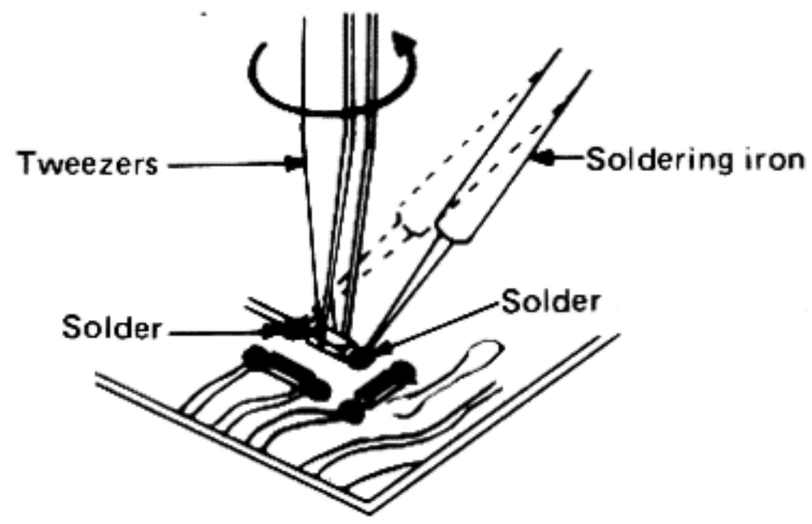


Fig. 19

- **Replacing procedure**

1. Place solder on the foil where the chip is fitted.
   Then solder the chip by holding the soldering iron as shown in Fig. 20.

Note:

1. If the chip jumper is removed, connect a coated lead wire to the part. (See Fig. 21).
   Chip jumper is marked with "J" on the printed circuit board.

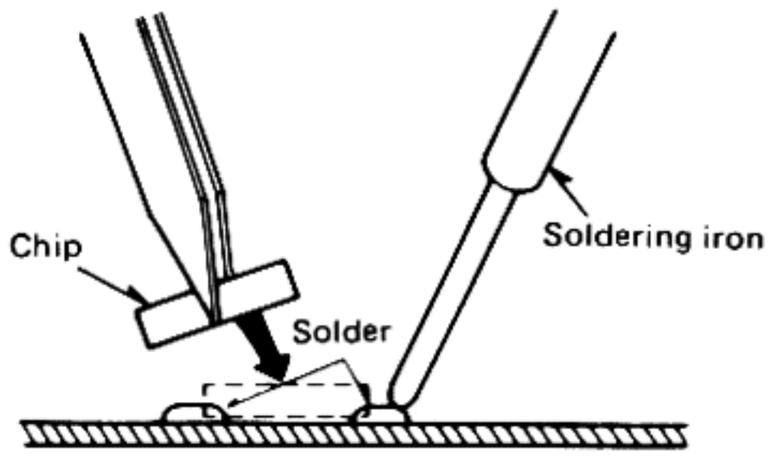


Fig. 20

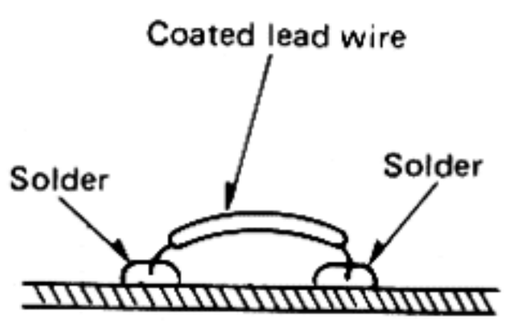


Fig. 21

- **Note for replacing chips**

1. Do not heat the chip more than 3 seconds.
2. Do not rub the electrode against the chip.
3. Use the tweezers with care not to damage the surface of the chip.
4. It is desirable to use a pencil type soldering iron. And use soldering iron less than 60W.

■ MEASUREMENTS AND ADJUSTMENTS

• Instruments used

1. Oscilloscope
2. DC voltmeter
3. 30cm record
4. Screwdriver

※ Shift the tonearm as in Fig. 24. (Servo gain and offset voltage adjustment.)
※ Shift the operation circuit board as in Fig. 25. (Clock frequency adjustment.)

Step	Item	Preparations	Parts adjusted	Procedure
1	Start position	1) Put 30 cm record on turntable mat and close upper cabinet. 2) Set power switch to "on". 3) Push start button switch.	Start position adjust screw. (Fig. 22)	1) If stylus descends during play of a tune, adjust by turning the screw.
2	Tonearm offset angle	1) Open upper cabinet. 2) Set power switch to "on". 3) Push start button to move tonearm inside, then set power switch to "off".	Offset angle adjust screw. (Fig. 23)	1) Turn offset angle adjust screw so that tonearm center is aligned to V-groove of lift rod.
3	Servo gain	1) Connect DC voltmeter to CN303 terminal 3 (+) and 2 (–) of operation circuit board. 2) Set power switch to "on".	VR501 (Fig. 24)	1) Completely shift tonearm to the right. 2) Adjust VR501 so that output voltage is 3.6V.
4	Offset voltage	1) Connect DC voltmeter to CN303 terminal 3 (+) and 2 (–) of operation circuit board. 2) Set power switch to "on".	Offset voltage adjust screw. (Fig. 24)	1) Set tonearm to center. 2) Turn adjust screw so that output voltage is 1.8V.
5	Clock frequency	1) Connect IC301 (pin ⑦ ~ ⑩ shorted) of operation circuit board. 2) Connect lead wire to Q1 E and IC301 pin ⑦. 3) Connect oscilloscope to IC301 pin ④.	VR301 (Fig. 25)	1) Set power switch to "on". 2) Adjust VR301 so that the cycle output waveform is 33μF ± 1μs.

• Adjustment points

Start position adjustment
This screw adjusts the stylus set down position at the beginning of a record.

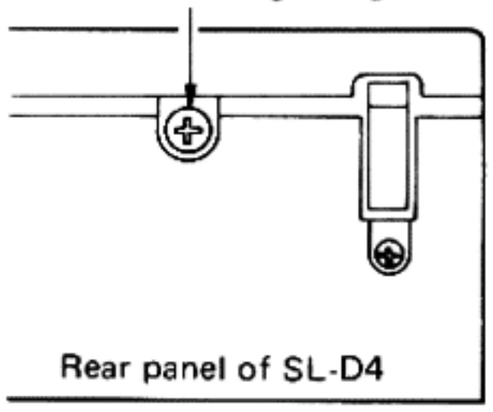


Fig. 22

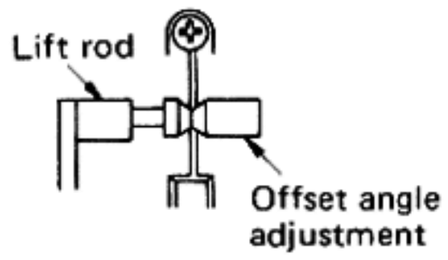
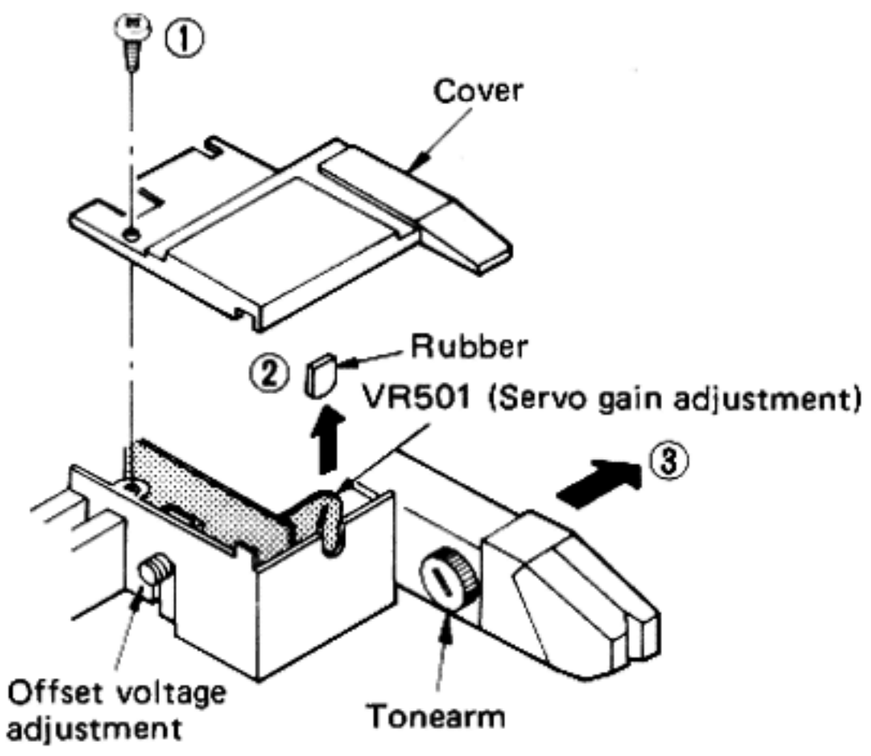
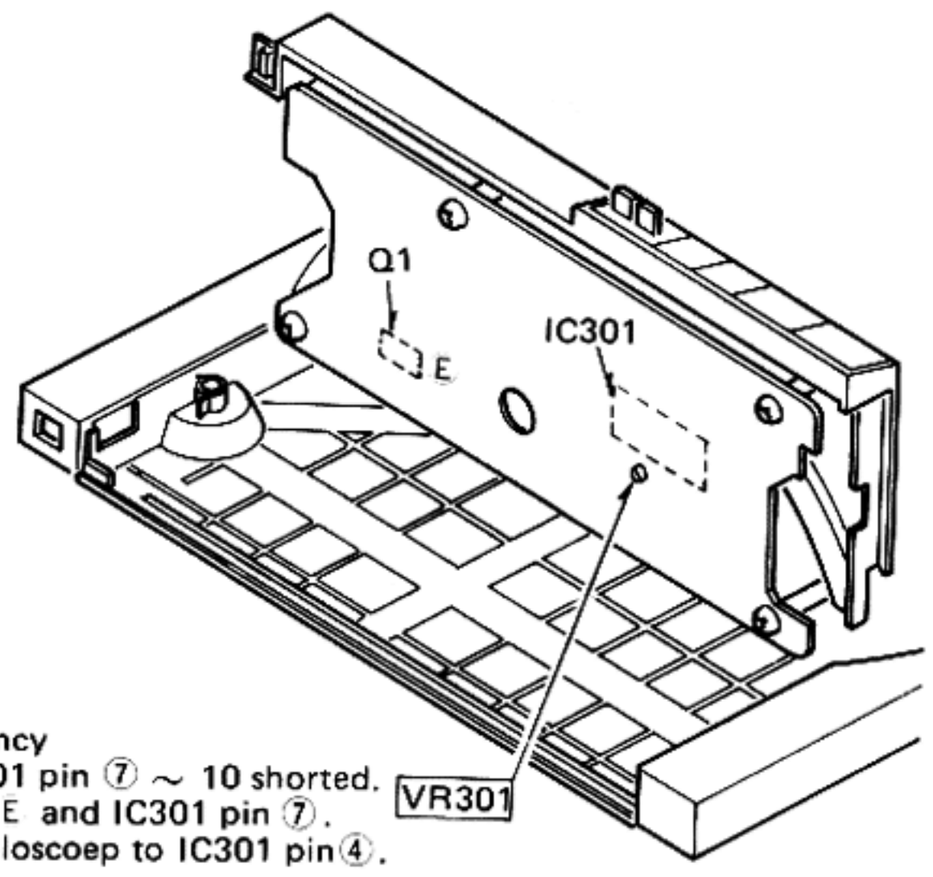


Fig. 23



① Remove the cover.
② Remove the rubber.
③ When adjusting the servo gain, set the tonearm in the direction of the arrow.

Fig. 24



* Clock frequency
① Connect IC301 pin ⑦ ~ 10 shorted.
② Connect Q1 E and IC301 pin ⑦.
③ Connect oscilloscoep to IC301 pin ④.

Fig. 25

■ MESSUNGEN UND JUSTIERUNGEN — Deutsch

- **Zu verwendende Instrumente**

1. Oszilloskop
2. Gleichstrom-Voltmeter
3. 30cm-Schallplatte
4. Schraubendreher

※ Den Tonearm wie in Abb. 24 gezeigt bewegen. (Servo-Verstärkung und Offset-Spannung Justierung.)
※ Steuer-Schaltplatte bewegen, wie in Abb. 25 gezeigt. (Taktgeber-frequenz Justierung.)

Schritt	Posten	Vorbereitungen	Zu justierende Teile	Vorgehen
1	**Start-Position**	1) 30cm-Platte auflegen und Plattenspieler-Gehäuseoberteil schließen. 2) Netzschalter auf "on" stellen. 3) Start-Taste drücken.	Startposition-Justierschraube (Abb. 22)	1) Falls Nadel innerhalb eines Musikstückes abgesenkt wird, durch Drehen dieser Schraube justieren.
2	**Tonarm-Offsetwinkel**	1) Gehäuseoberteil öffnen. 2) Netzschalter auf "on" stellen. 3) Start-Taste drücken, um Tonarm nach innen zu bewegen; dann Netzschalter auf "off" stellen.	Spurfehlwinkel-Justierschraube (Abb. 23)	1) Spurfehlwinkel-Justierschraube drehen, bis die Tonarmmitte mit der V-Kerbe der Liftstange übereinstimmt.
3	**Servo-Verstärkung**	1) Gleichstrom-Voltmeter an CN303, Anschluß 3 (+) und 2 (–) der Steuer-Schaltplatte anschließen. 2) Netzschalter auf "on" stellen.	VR501 (Abb. 24)	1) Tonarm ganz nach rechts bewegen. 2) VR501 so justeren, daß die Ausgangsspannung 3,6V beträgt.
4	**Offset-Spannung**	1) Gleichstrom-Voltmeter an CN303, Anschluß 3 (+) und 2 (–) der Steuer-Schaltplatte anschließen. 2) Netzschalter auf "on" stellen.	Offsetspannungs-Justierschraube (Abb. 24)	1) Tonarm in die Mitte stellen. 2) Justierschraube so einstellen, daß Ausgangsspannung 1,8V beträgt. (Sechskantschlüssel verwenden.)
5	**Taktgeber-frequenz**	1) IC301 Stift 7 mit Stift 10 verbinden. (Kurzschließen). 2) Q1 (E) an IC301, Stift 7 an schließen. 3) Oszilloskop an IC301, Stift 4 anschließen.	VR301 (Abb. 25)	1) Netzschalter auf "on" stellen. 2) VR301 so justieren, daß Ausgangswellenformperiode 33μs ± 1μs beträgt.

■ MESURAGES ET RÉGLAGES — Français

- **Instruments et appareils utilisés**

1. Oscilloscope
2. Voltmètre à C.C.
3. Disque de 30 cm
4. Tournevis

※ Déplacer le bras de lecture comme il est montré à la Fig. 24. (Amplification servo-mécanique et Tension de suppression Réglages.)
※ Déplacer la plaquette à circuits imprimés du circuit de contrôle comme il est montré à la Fig. 25. (Fréq. des impulsions de rythme Réglage.)

Etape	Article	Préparatifs	Eléments à régler	Marche à suivre
1	**Position de mise en marche**	1) Placer un disque de 30 cm sur la platine et refermer le boîtier supérieur. 2) Régler l'interrupteur d'alimentation sur "on" (marche). 3) Appuyer sur l'interrupteur à bouton de mise en marche.	Vis de réglage du positionnement de démarrage. (Fig. 22)	1) Si la pointe de lecture s'abaisse durant l'audition d'und plage musicale, ajuster en tournant la vis.
2	**Angle de décalage du bras de lecture**	1) Ouvrir le boîtier supérieur. 2) Régler l'interrupteur d'alimentation sur "on" (marche). 3) Appuyer sur l'interrupteur à bouton de mise en marche pour faire déplacer le bras de lecture vers l'intérieur, puis régler l'interrupteur d'alimentation sur "off" (hors circuit).	Vis de réglage de l'angle de décalage. (Fig. 23)	1) Tourner la vis d'ajustement de l'angle de décalage de telle sorte que le centre du bras de lecture soit aligné sur la rayure en V de la tige d'élévation.

Etape	Article	Préparatifs	Eléments à régler	Marche à suivre
3	**Amplification servo-mécanique**	1) Brancher un voltmètre à C.C. à la borne 3 (+) et 2 (—) CN303 de la plaquette à circuits imprimés du circuit de contrôle. 2) Régler l'interrupteur d'alimentation sur "on" (marche).	VR501 (Fig. 24)	1) Faire pivoter entièrement vers la droite le bras de lecture. 2) Ajuster VR501 de telle sorte que la tension de sortie soit de 3,6V.
4	**Tension de suppression**	1) Brancher un voltmètre à C.C. à la borne 3 (+) et 2 (—) CN303 de la plaquette à circuits imprimés du circuit de contrôle. 2) Régler l'interrupteur d'alimentation sur "on" (marche).	Vis d'ajustement de la tension de suppression. (Fig. 24)	1) Placer le bras de lecture au milieu. 2) Tourner la vis d'ajustement de telle sorte que la tension de sortie soit de 1,8V. (Utiliser la clef hexagonale.)
5	**Fréquence des impulsions de rythme**	1) Connecteur la broche 7 IC301 à la broche 10. (Court-circuitage) 2) Connecter Q1 (E) à la broche IC301. 3) Brancher un oscilloscope à la broche 4 IC301.	VR301 (Fig. 25)	1) Régler l'interrupteur d'alimentation sur "on" (marche). 2) Ajuster VR301 de telle sorte que la période de forme d'onde de sortie soit de 33μs ± 1μs.

■ MEDICIONES Y AJUSTE — Español

- **Instrumentos usados**

1. Osciloscopio
2. Voltímetro de CC
3. Disco de 30cm
4. Destornillador

※ Mover el brazo de fonocaptor como en la Fig. 24. (Servoganancia y Contratensión ajuste.)
※ Mover le P.C.B. de circuito de control como en la Fig. 25. (Frecuencia de reloj ajuste.)

Peso	Item	Preparaciónes	Piezas ajustadas	Procedimento
1	**Posición de arranque**	1) Poner disco de 30cm sobre plato giradiscos y cerrar el gabinete superior. 2) Poner interruptor de corriente en "on". 3) Apretar interruptor botón de arranque.	Tornillo de ajuste de posición de arranque (Fig. 22)	1) Si la aguja desciende durante el toque de una tonada, ajustar girando el tornillo.
2	**Angulo de fricción de brazo fonocaptor**	1) Abrir gabinete superior. 2) Poner interruptor de corriente en "on". 3) Apretar botón de arranque para mover brazo fonocaptor dentro, luego poner interruptor de corriente en "off".	Tornillo de ángulo de fricción (Fig. 23)	1) Girar tornillo de ajuste de ángulo de fricción de manera que el centro del brazo de fonocaptor esté alineado con ranura-V de varilla de alza.
3	**Servoganancia**	1) Conectar voltímetro de CC a terminal CN303 3 (+) y 2 (—) de circuit control P.C.B. 2) Poner interruptor de corriente en "on".	VR501 (Fig. 24)	1) Cambiar completamente el brazo fonocaptor a la derecha. 2) Ajustar VR501 de manera que tensión de salida sea 3,6V.
4	**Contratensión**	1) Conectar voltímetro de CC a terminal CN303 3 (+) y 2 (—) de circuit control P.C.B. 2) Poner interruptor de corriente en "on".	Tornillo de ajuste de ángulo de fricción. (Fig. 24)	1) Poner brazo de fonocaptor en centro. 2) Girar tornillo de ajuste de manera que tensión de salida sea 1,8V. (Usar llave hexagonal.)
5	**Frecuencia de reloj**	1) Connectar perno 7 de IC301 a perno 10. (Cortocircuito) 2) Conectar Q1 (E) a perno de IC301 7. 3) Conectar osciloscopio a perno 4 de IC301.	VR301 (Fig. 25)	1) Poner interruptor de corriente en "on". 2) Ajustar VR301 de manera que periodo de forma de onda de salida sea 33μs ± 1μs.

■ TERMINALS OF MN1402FPG

*Listed below are the basic functions of MN1402FPG. Note that some terminals need not be used and some circuit functions may be partially changed depending on specific system application.

No.	Mark	Description
1	Vss	Ground terminal
2	C09	Cueing control terminal ("H" only during cueing and cueing down)
3	C08	Cueing control terminal ("H" during cueing down — about 1.2 sec)
4	C07	Switching output terminal
5	C06	Turntable speed select terminal (unused)
6	C05	Repeat indicator drive terminal
7	AI3	Start key input terminal
8	AI2	Stop key input terminal
9	AI1	Cueing key input terminal
10	AI0	Repeat key input terminal
11	BI3	Cabinet open/close detecting terminal (unused)
12	BI2	Cabinet open/close detecting terminal (unused and connected to +5V power supply)
13	BI1	Rest position detecting terminal ("H" when tonearm is at rest position)
14	BI0	Record size detecting terminal ("H" when 30 cm record is present)

No.	Mark	Description
15	C00	Tonearm drive motor control terminal (Arm servo)
16	E01	
17	E02	
18	E03	
19	RST	Reset terminal (micom is reset at "L")
20	TST	Test terminal (connected to ground)
21	D03	Terminals unused
22	D02	
23	D01	Synchro-rec control
24	D00	Turntable start/stop terminal ("H" at stop "L" at start)
25	SNSO	Offset angle detection input terminal
26	SNSI	Arm position detecting input terminal
27	VDD	Power supply (+5V)
28	OSC	Oscillator (Adjust clock frequency to 33μs ± 1μs)

■ TROUBLE SHOOTING

1. How to check operation circuit board

(1) Remove the turntable platter. **(Refer to "How to remove turntable platter".)**
(2) Remove the front cover, and check each part from the back of P.C.B. as in **Fig. 26**.

2. How to check drive circuit board

(1) Remove the turntable platter. **(Refer to "How to remove turntable platter".)**
(2) Check the P.C.B. from above it with turntable not operated.
(3) Check the P.C.B. with turntable operated. **(See Fig. 27)**
   a. Remove the stator frame.
   b. Put the stator frame on the cylinder. (exampel a roll of gum tape)
   c. Connect the tester lead wire to the check point, put the turntable platter in place and then check the P.C.B. with turntable operated.

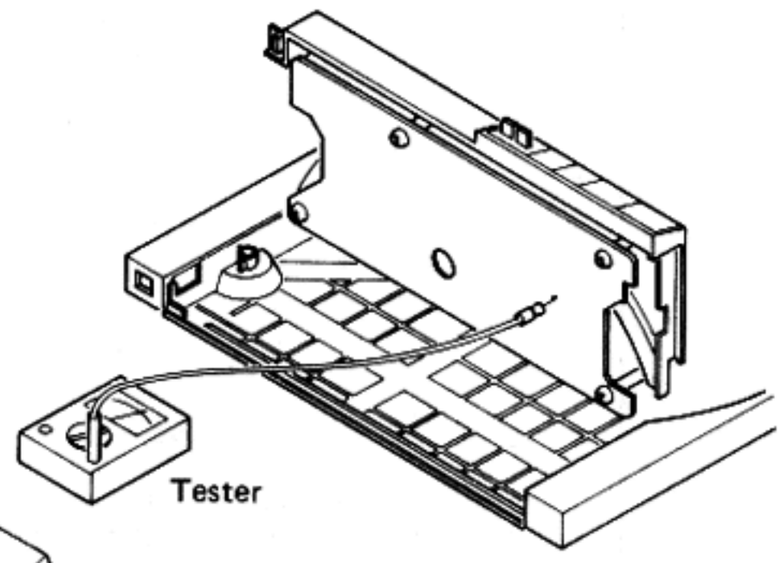


Fig. 26

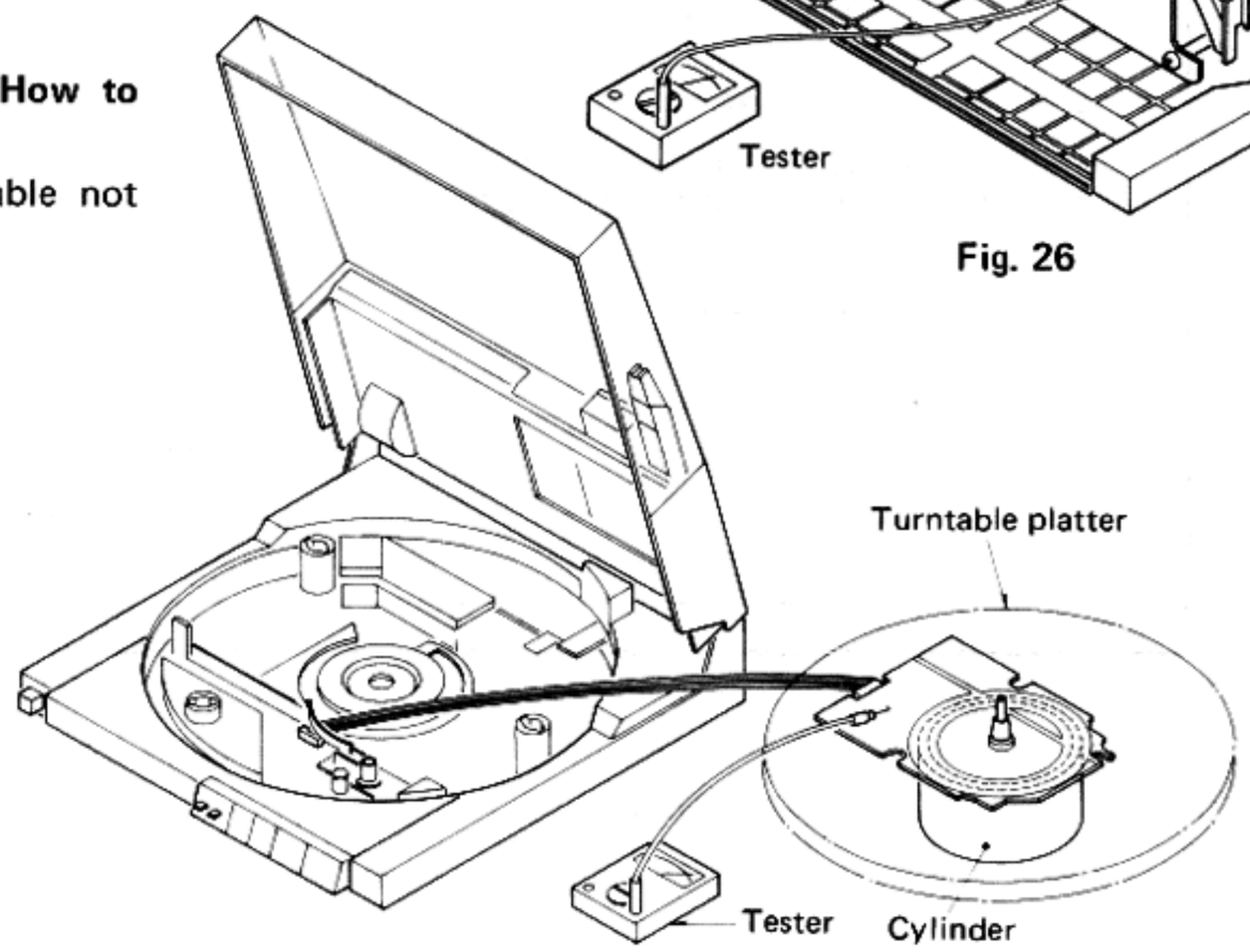


Fig. 27

Turntable does not rotate

Power source circuit
1. AC19V between CN1 terminals ① and ②.
2. DC voltage of regulator IC (IC1). ① 22V, ② 0V, ③ 12V.
3. DC voltage of regulator transistor (Q1). Ⓒ 10.5V, Ⓑ 5.6V, Ⓔ 5V
4. DC voltage at terminal ① of IC101. (12V)
5. DC voltage at terminal ⑱ of IC201. (8.5V)

NO → 1.Power transformer, AC cord 2.IC1, S1, D1, C1~C5 3.Q1, D2 R1~R3 4.IC101 5.IC201

YES

Clock frequency
1. IC301 terminal ⑦ ~ ㉗ connected. (⑦ ~ ⑩ pin shorted) Waveform of terminal ④ of IC301.

NO → IC301 VR301 C301

YES

Push start switch, (S301).

Start/stop circuit
1. DC voltage at base of Q301. (4.3V)
2. DC voltage at terminal ⑦ of IC301. (5V).
3. DC voltage at terminal ㉔ of IC301. (0V).
4. DC voltage at terminal ⑩ of IC201. (0V)
5. DC voltage at terminal ② of of IC101. (0.8V)

NO → 1. S301, Q301, D303, R325, R326 2. IC301 3. IC301 4. IC201 5. IC101

YES

Drive coil and Hall element
1. Conduction check of drive coils. (About 33Ω)
2. DC voltage of Hall elements.

	①	②	③	④
Voltage	3.8	7.6	3.8	0

NO → 1. Drive coil 2. H101, H02, IC101

YES

Drive circuit (Stop)
1. DC voltage at each terminal of IC101

	②	③	④~⑩	⑪
Voltage	0	12	0	6

NO → IC101

YES

Drive circuit (Rotation)
1. DC voltage at each terminal of IC101.

	②	⑨	⑩	⑪
Voltage	0.8	4.9	4.9	4.7

2. Waveform between terminal ④ and ⑤ (⑥and⑦) of IC101.

NO → IC101

Arm motor does not rotate

1. Measurement of tonearm drive rope.
2. Measurement of tonearm drive belt.

NO → Rope and belt dislocation

YES

Arm motor control circuit
1. DC voltage at each terminal of IC301.

	⑮	⑯	⑰	⑱
Stop	5	5	0.7	0.7
Lead-in	0	5	0	0.7
Return	5	0	0.7	0

2. DC voltage at each terminal of IC401.

	①	②	③
Stop · Lead-in	1.2	3.7	3.6
Return	11	2	3.6

3. DC voltage at each terminal of IC401.

	⑤	⑥	⑦
Stop · Return	3.6	3.7	1.2
Lead-in	3.6	2	11

4. DC voltage of Q401 ~ Q404.

	Q401		Q403	
	Ⓑ	Ⓔ	Ⓑ	Ⓒ
Stop	0.4	0	0.7	0
Return	8.5	8.2	0	8.2

	Q402		Q404	
	Ⓑ	Ⓔ	Ⓑ	Ⓒ
Stop	0.4	0	0.7	0
Return	8.5	8.2	0	8.2

NO → 1. IC301 2. IC401 3. IC401 4. Q401~404 RF1

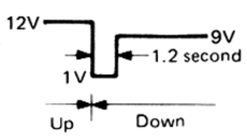
Lead-in return defective with 17cm record

Arm position detection circuit
1. DC voltage of Hall IC (IC2) ① 12V, ② 0V, ③ 4.5V
2. Clearance between Hall IC and magnet.
3. Waveform of IC2 terminal ③ during arm motor rotation.

NO → 1.IC2 2.Adjustment (See Fig. 14) 3.IC2, 301

Cueing down/up does not work

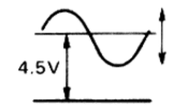
Cueing control circuit
1. DC voltage of IC301 terminal ②. (During cueing and down 0.8V.)
2. DC voltage of IC301 terminal ③. (Only during cueing down 1.6V.)
3. DC voltage of Q304 Ⓒ



NO → 1. IC301 2. Q303, 304 Plunger

Unstable rotation

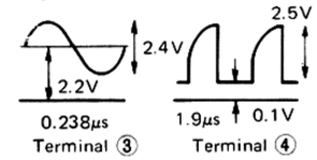
FG amplifier circuit
1. Conduction check of FG coil.
2. Waveform of terminal ⑮ of IC201.



NO → FG coil IC201 R203, 205 C201~203

YES

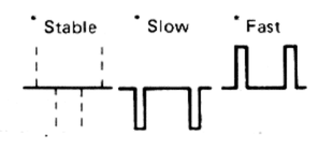
Quartz oscillator circuit
1. Waveform of terminals ③ and ④ of IC201.



NO → X201 IC201 C204~205

YES

Speed control circuit
1. Waveform of terminal ⑭ of IC201.



NO → IC201 IC101

YES

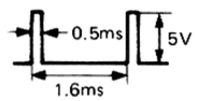
Phase control circuit
1. Waveform of terminal ⑬ of IC201.

*In-phase *Phase lag *Phase lead

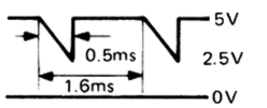
NO → IC201 IC101

Offset angle does not detection

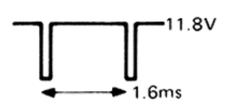
Offset error angle detection circuit
1. Waveform of terminal ⑥ of IC301. (During cueing down)



2. DC voltage of Q305 Ⓑ . . . (1.8V)
3. Waveform of Q305 Ⓒ.

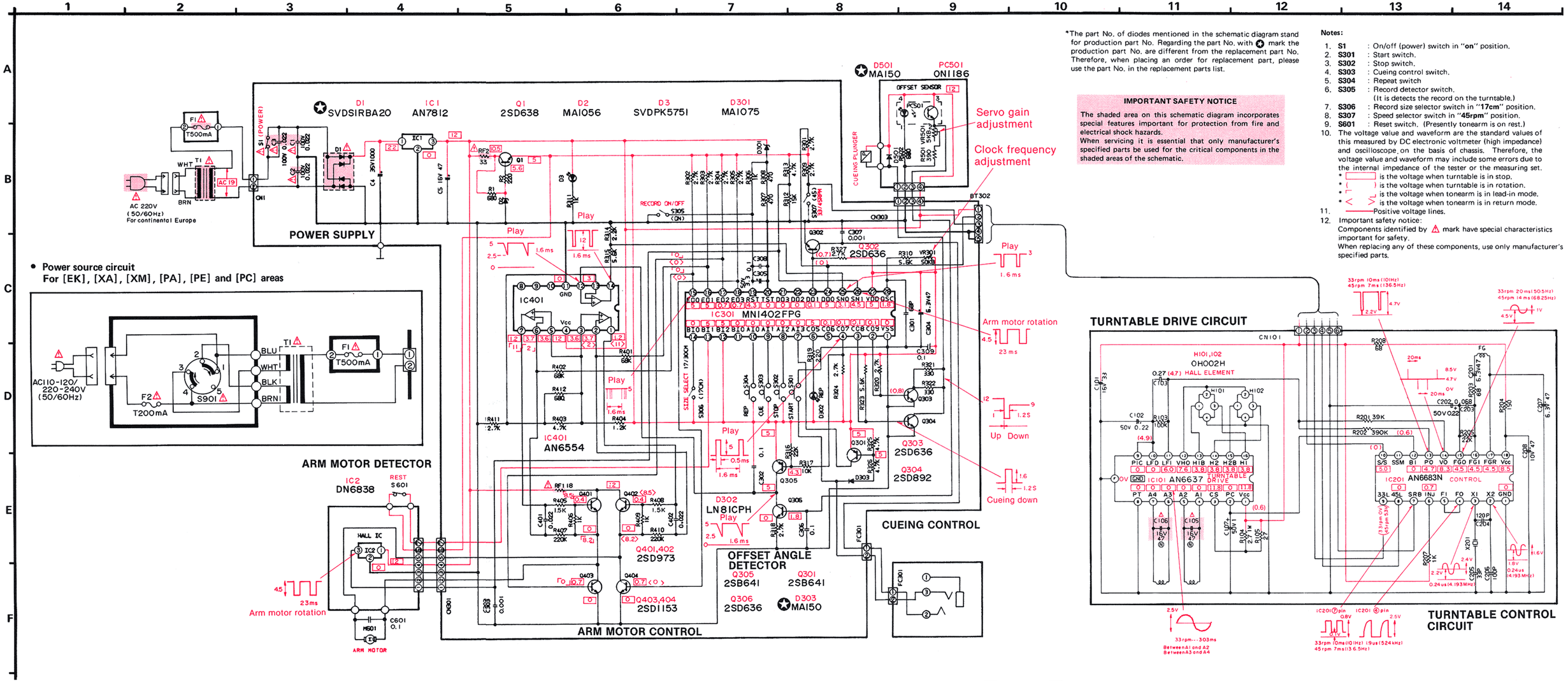


4. Waveform of terminal ⑧ of IC401.



NO → 1.IC301 2.Q305, PC501 3.Q305, 306 C302 4 IC401

■ SCHEMATIC DIAGRAM (This schematic diagram may be modified at any time with the development of new technology.)



*The part No. of diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement parts list.

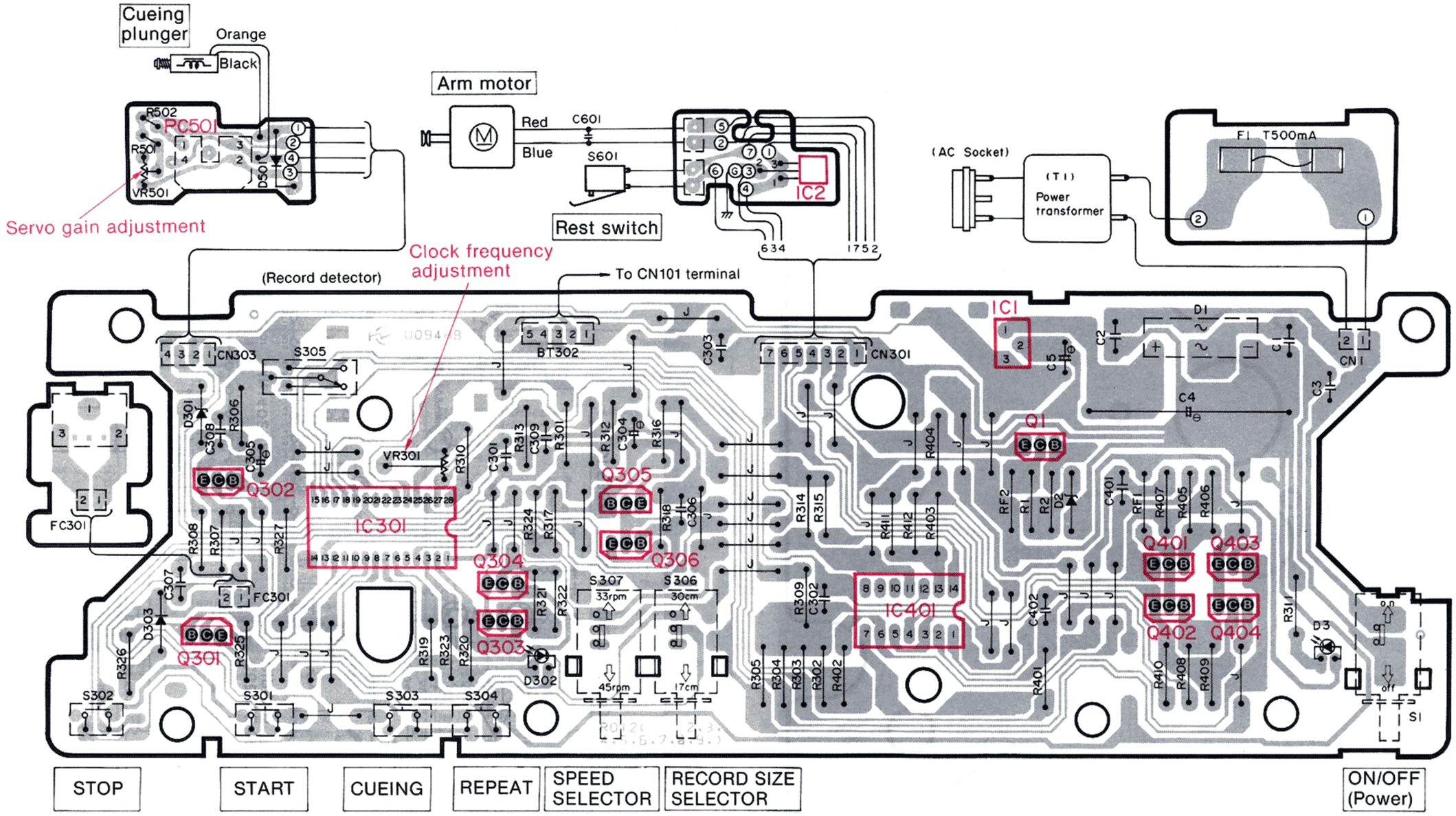
IMPORTANT SAFETY NOTICE

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

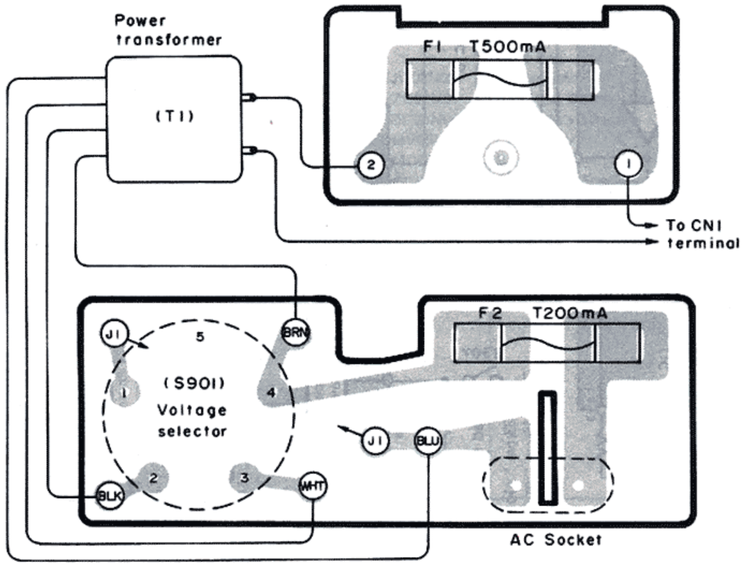
Notes:

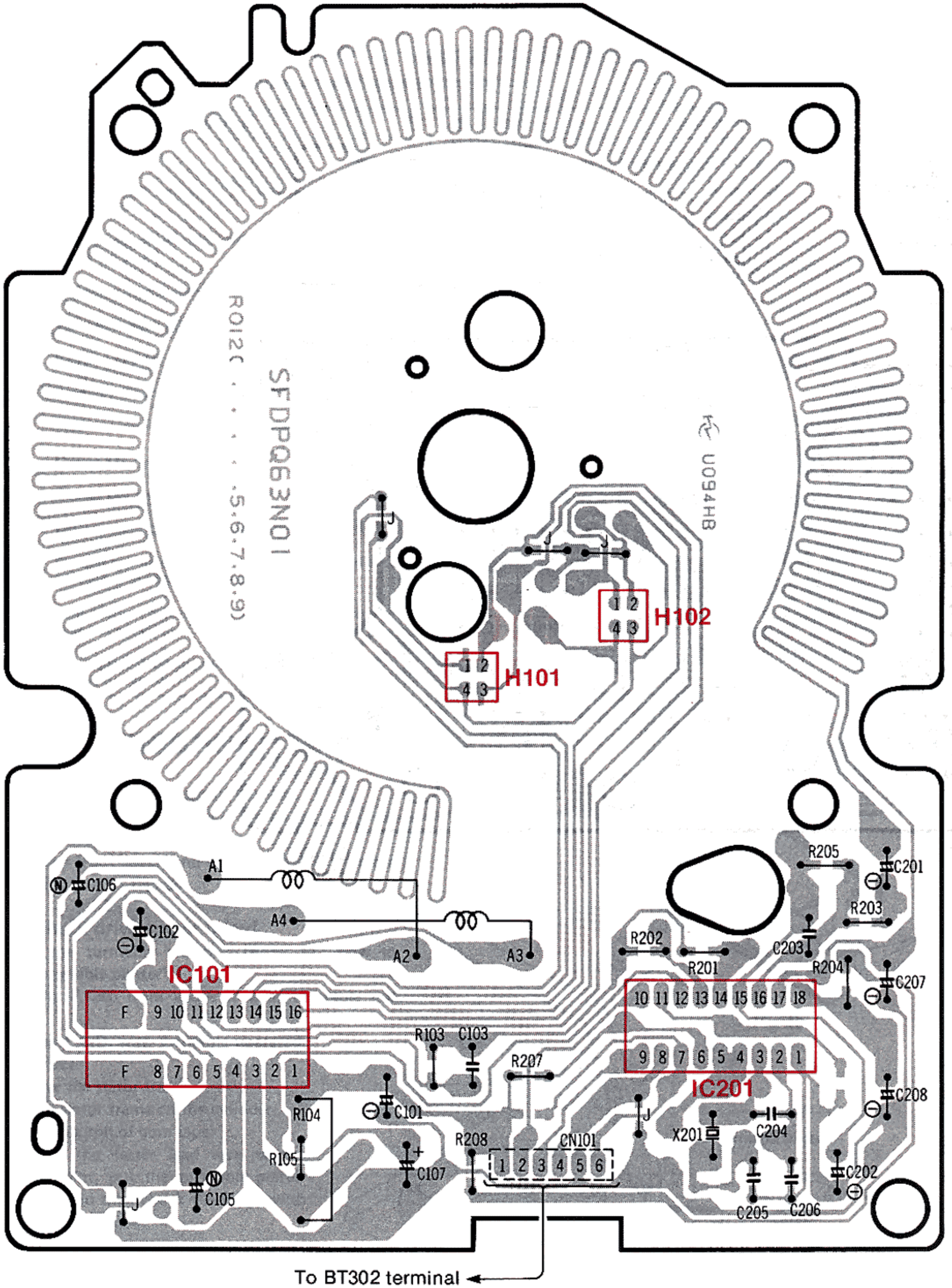
1. **S1** : On/off (power) switch in "**on**" position.
2. **S301** : Start switch.
3. **S302** : Stop switch.
4. **S303** : Cueing control switch.
5. **S304** : Repeat switch
6. **S305** : Record detector switch.
   (It is detects the record on the turntable.)
7. **S306** : Record size selector switch in "**17cm**" position.
8. **S307** : Speed selector switch in "**45rpm**" position.
9. **S601** : Reset switch. (Presently tonearm is on rest.)
10. The voltage value and waveform are the standard values of this measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Therefore, the voltage value and waveform may include some errors due to the internal impedance of the tester or the measuring set.
    * ▭ is the voltage when turntable is in stop.
    * ⟨ ⟩ is the voltage when turntable is in rotation.
    * ⊓ is the voltage when tonearm is in lead-in mode.
    * < > is the voltage when tonearm is in return mode.
11. ——— Positive voltage lines.
12. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety.
    When replacing any of these components, use only manufacturer's specified parts.

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM



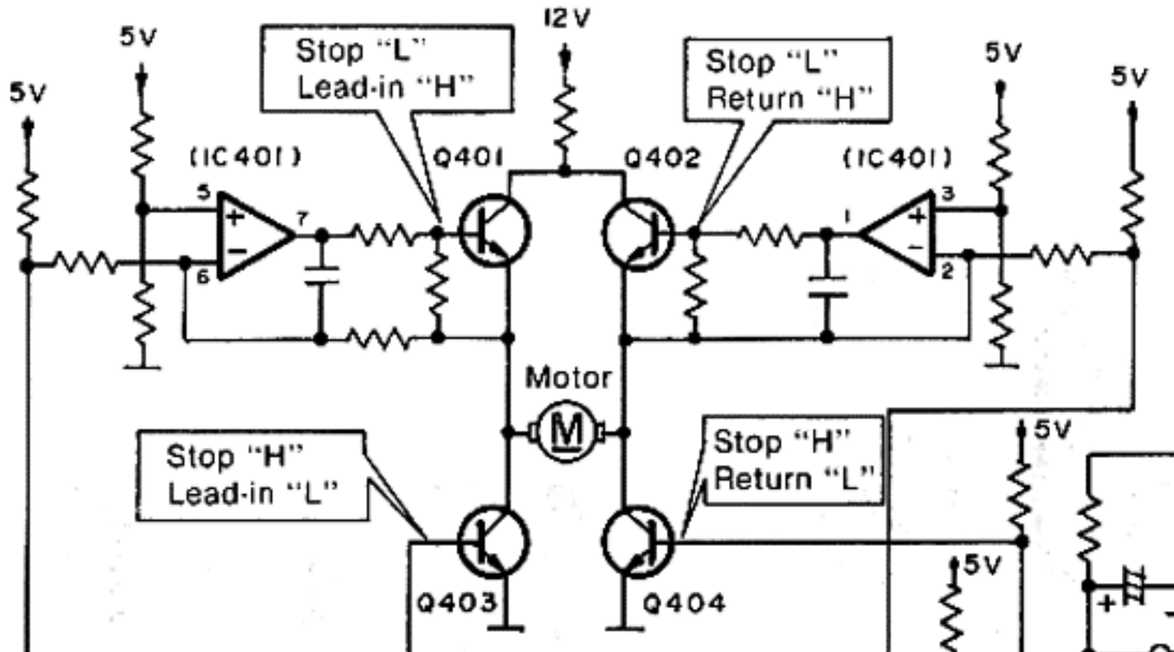
- **Power source circuit**
  For [EK], [XA], [XM], [PA], [PE] and [PC] areas



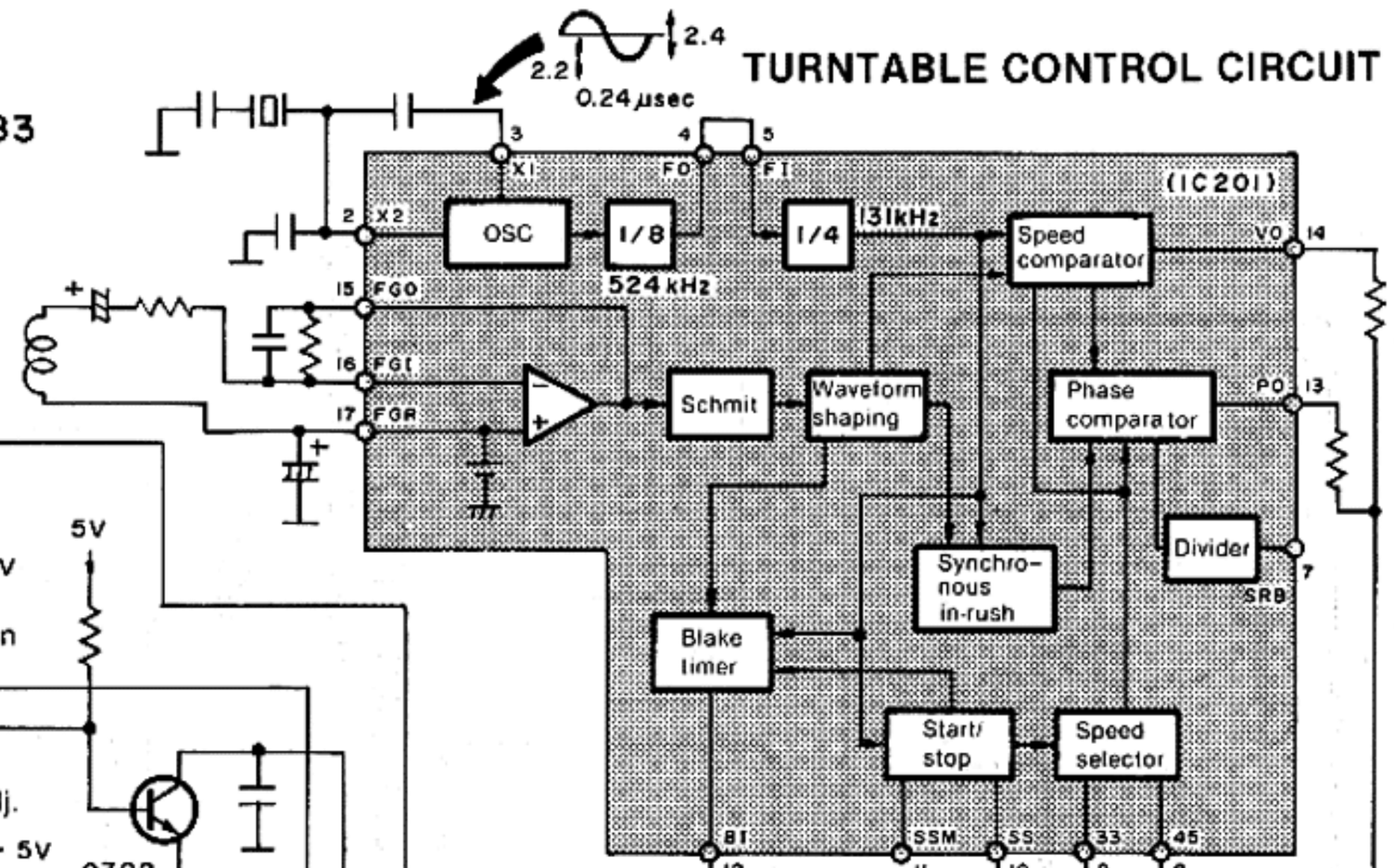

SFDPQ63N01
R012C . . . . . 5.6.7.8.9)
U094HB
H101
H102
IC101
IC201
CN101
A1
A2
A3
A4
C101
C102
C103
C105
C106
C107
C201
C202
C203
C204
C205
C206
C207
C208
R101
R102
R103
R104
R105
R201
R202
R203
R204
R205
R207
R208
X201
J
To BT302 terminal

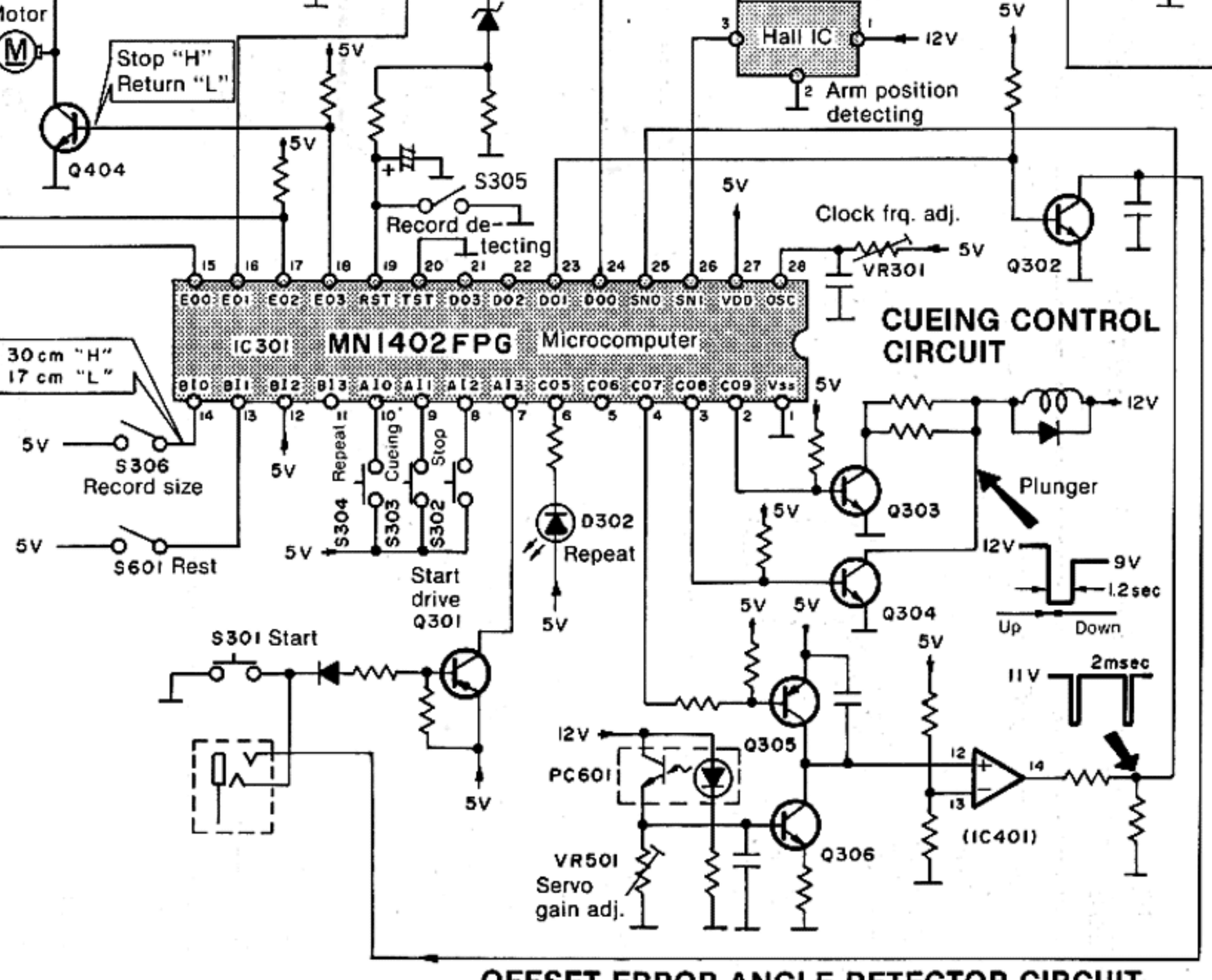
■ BLOCK DIAGRAM

ARM MOTOR CONTROL CIRCUIT

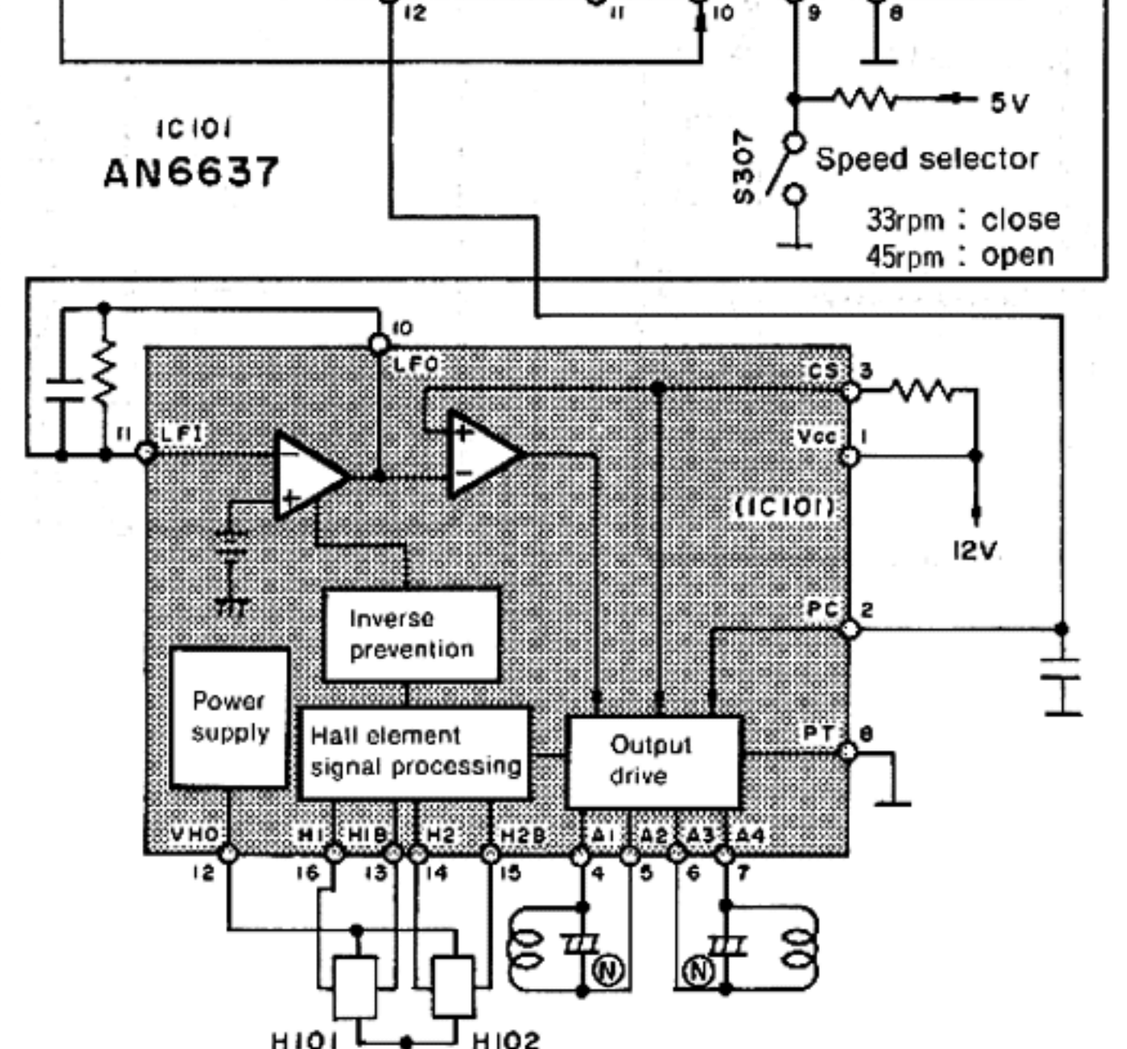


TURNTABLE CONTROL CIRCUIT



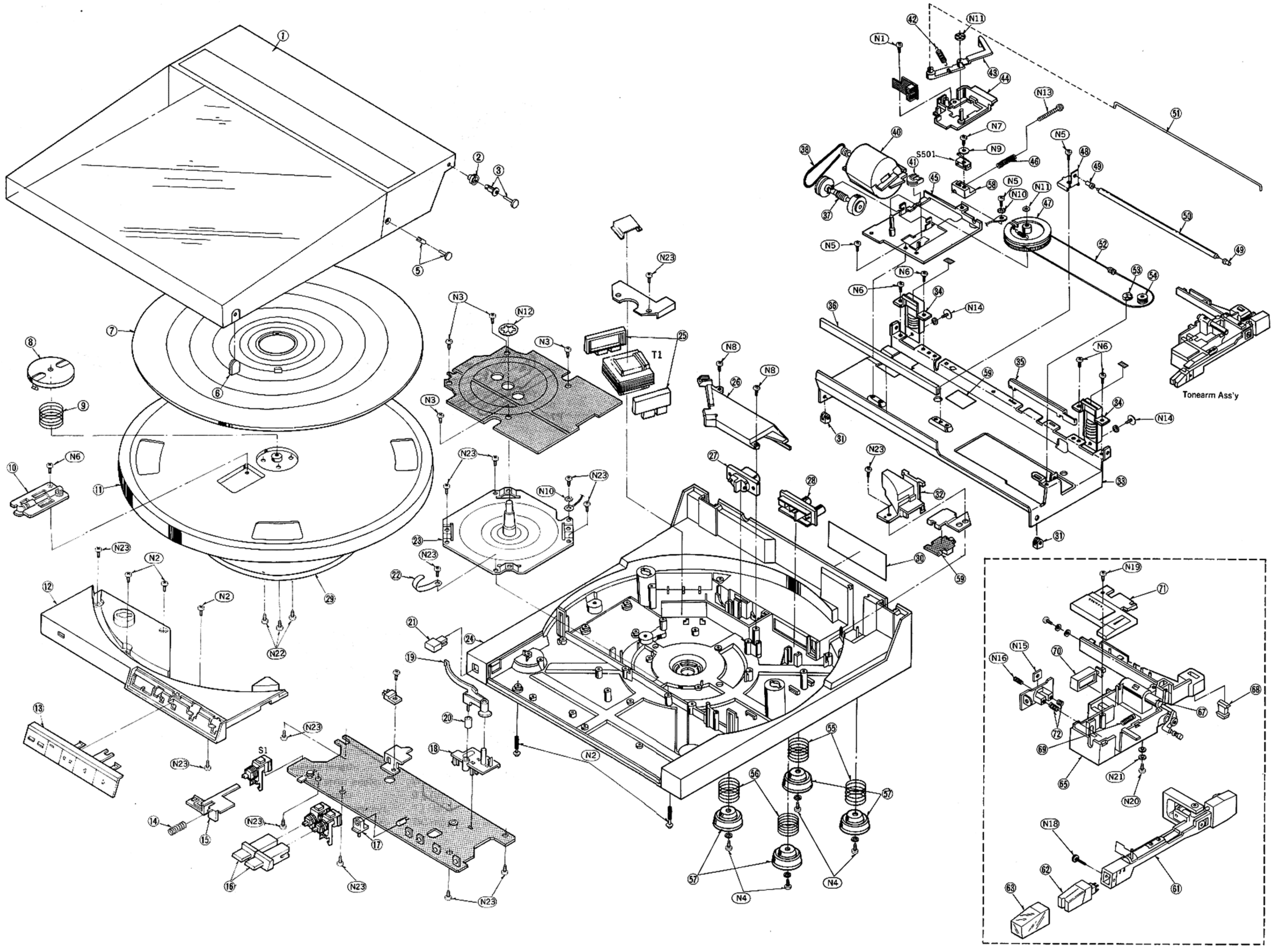


OFFSET ERROR ANGLE DETECTOR CIRCUIT



TURNTABLE DRIVE CIRCUIT

■ EXPLODED VIEW



■ REPLACEMENT PARTS LIST

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "Ⓢ" mark is service standard parts and may differ from production parts.
5. Ⓚ -marked parts are used for black only, while ○-marked parts are for silver type only.
6. Parts other than Ⓚ - and ○-marked are used for both black and silver types.
7. The parenthesized numbers in the columns of description stand for the quantity per set.

Areas

- * [E] is available in Switzerland and Scandinavia.
- * [EK] is available in United Kingdom.
- * [XL] is available in Australia.
- * [EG] is available in F.R. Germany.
- * [EB] is available in Belgium.
- * [EH] is available in Holland.
- * [EF] is available in France.
- * [Ei] is available in Italy.
- * [EC] is available in Czechoslovakia.
- * [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- * [XM] is available in Central South America.
- * [PA] is available in far East PX.
- * [PE] is available in European Military.
- * [PC] is available in European Audio Club.

Black type model No. : SL-D4/(K)

Ref. No.		Part No.	Description	
CABINET AND CHASSIS PARTS				
1	○	SFADD04N01E	Dust Cover	(1)
1	Ⓚ	SFADD04N21E	Dust Cover	(1)
2	○	SFGZQ06N01	Rubber,Latch	(2)
2	Ⓚ	SFGZC02N01	Rubber,Latch	
3	○	SFUMD04N07	Latch,Dust Cover	(2)
3	Ⓚ	SFUMC02N14	Latch,Dust Cover	(2)
5	○	SFUMD04N09	Latch,Dust Cover	(2)
5	Ⓚ	SFUMC02N18	Latch,Dust Cover	(2)
6	○	SFGZD04N01	Cushion Rubber	(2)
6	Ⓚ	SFGZD04N21	Cushion Rubber	(2)
7		SFTGQ05N01	Turntable Mat	(1)
8		SFWEC06N01	45r.p.m.Adaptor	(1)
9		SFQAC06N01	Spring,45r.p.m.Adaptor	(1)
10		SFUMC05N11A	Record Detector Ass'y	(1)
11		SFTED04N01	Turntable Platter	(1)
12	○	SFUMD04N01	Front Cover	(1)
12	Ⓚ	SFUMD04N21	Front Cover	(1)
13	○	SFKTD04N01E	Operation Button Ass'y	(1)
13	Ⓚ	SFKTD04N21E	Operation Button Ass'y	(1)
14		SFQAD04N01	Spring,On/Off Switch Lever	(1)
15		SFUMD04N02	Lever,On/Off Switch	(1)
16		SFKTL30R01	Knob,Speed Selection	(2)
17		SFUMC02N09	Holder,L.E.D.	(1)
18		SFUMC02N35	Holder,Switch S305	(1)
19		SFUMC02N33	Lever,Record Detection	(1)
20		SFGCC02N03	Cushion Rubber,Record Detection Lever	(1)
21		SFKTC06N04	Button,On/Off Switch	(1)
22		SXE513	Clamper,Lead Wires	(1)
23		SFMZC06N01R	Stator Frame Ass'y	(1)
24	○	SFACD04N01	Cabinet	(1)
24	Ⓚ	SFACD04N21	Cabinet	(1)
25 [EK,XA,XM,PA,PE,PC]		SFGCD04X01	Cushion Rubber, Power Transformer	(2)
25 [Other Areas]		SFGCC02N02	Cushion Rubber, Power Transformer	(2)
26		SFUMC02N04	Cover,A.C.Socket	(1)
27 [XL] ⚠		SFDJHSC0491	A.C.Socket	(1)
27 [XA,XM,PA,PE,PC] ⚠		SFDJHSC04912	A.C.Socket	(1)
27 [Other Areas] ⚠		SFDJHSC0498	A.C.Socket	(1)

Ref. No.		Part No.	Description	
28		SFDJC03N08E	Jack,Phono Output	(1)
29		SFTMC07-01E	Rotatory Magnet, Turntable Platter	(1)
30 [E,EC]		SFNND04S01	Name Plate	(1)
30 [EK]		SFNND04G01	Name Plate	(1)
30 [XA,XM]		SFNND04X01	Name Plate	(1)
30 [PA,PE]		SFNND04P01	Name Plate	(1)
30 [PC]		SFNND04P02	Name Plate	(1)
30 [Other Areas]		SFNND04R01	Name Plate	(1)
31		SFGZC02N02	Rubber,Dust Cover	(2)
32	○	SFUMD04N10	Cover,Lead Wires	(1)
32	Ⓚ	SFUMD04N22	Cover,Lead Wires	(1)
33		SFUKC02N01E	Base Ass'y Tonearm	(1)
34		SFATC02N01E	Hinge	(2)
35		SFUMC02N12	Holder,Lead Wires	(1)
36		SFUMD04N03	Spacer,Dust Cover	(1)
37		SFUML11R02A	Worm Gear Ass'y	(1)
38		SFGBC10-01	Belt,Tonearm Drive	(1)
39	⚠	SJT347	Fuse Holder	(4)
40		SFMHC02N02R	Motor Ass'y, Tonearm Drive	(1)
41		SFUMC02N10	Lope Guide	1
42		SFQHQ34N22	Spring,Rest Switch Lever	1
43		SFUMC02N05	Lever,Rest Switch	1
44		SFUMC02N13	Base Assy,Rest Switch	1
45		SFUPBL3N01E	Tonearm Motor Base Ass'y	1
46		SFQA913-01	Spring,Adjustment	1
47		SFUML11R03	Wheel,Tonearm Drive	1
48		SFUPC02N03	Bracket,Guide Rail	1
49		SFGCC5N05	Cushion Rubber, Guid Rail	2
50		SFXJC02N03	Guide Rail	1
51		SFUZC02N01	Rod,Rest Switch	1
52		SFUZC05N02E	Lope Ass'y,Tonearm Drive	1
53		SFUMV05N23	Cap,Pulley	1
54		SFUMC05N22	Pulley	1
55		SFQCC02N01	Spring,Insulator(Rear)	2
56		SFQCC02N02	Spring,Insulator (Front)	2
57		SFGAC05N02	Insulator	4
58		SFUMC02N06	Base,Rest Switch	1
59		SFDJD04N02	Jack,Synchro Recording	1

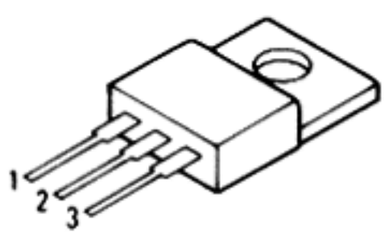
Ref. No.		Part No.	Description	
TONEARM PARTS				
61		SFPAM00301A	Tonearm	(1)
62 [PA,PE,PC]		EPC-P28AK	★Cartridge	(1)
62 [Other areas]		EPC-P27SAK	★Cartridge	(1)
[PA,PE,PC,PE,]		EPS-28CS	★Stylus	(1)
[Other areas]		EPS-27CS	★Stylus	(1)
63		SFCNCO2301	Cover,Stylus	(1)
65		SFPKD00301R	Tonearm Base Ass'y	(1)
67		SFPJU00301	Bearing,Guide Rail	(1)
68		SFPGML1101	Rubber	(1)
69		SFPSP00504	Spring,Tonearm Lift	(1)
70		SFDZCO5N01E	Cueing Solenoid Ass'y	(1)
71		SFPCS00304	Cover,Tonearm Base	(1)
72		SFPSP00302	Spring,Adjustment	(2)
SCREWS,WASHERS AND NUT				
N1	Ⓢ	XTV3+8BFN	Screw,⊕3×8	2
N2	Ⓢ	XTV3+20BFN	Screw,⊕3×20	5
N3	Ⓢ	XTV3+6BFN	Screw,⊕3×6	4
N4		XTW3+10QFZ	Screw,⊕3×10	4
N5	Ⓢ	XTV3+6BFZ	Screw,⊕3×6	3
N6		XTV3+6BFZ	Screw,⊕3×6	5
N7		XTN16+10G	Screw,⊕1.6×10	1
N8	Ⓢ	XTV3+10BFN	Screw,⊕3×10	2
N9	Ⓢ	XWE2BW	Washer, ϕ2	1
N10	Ⓢ	XWC3B	Washer, ϕ3	2
N11		CSTW3	Washer, ϕ3	2
N12		SFXWC06N02	Washer	1
N13	Ⓢ	XSN3+30S	Washer,⊕3×30	1
N14		XTWS3+14TFZ	Screw,⊕3×14	2
N15		SFXN623-1	Nut	1
N16		SFPTN00301	Screw,Adjustment	1
N17	Ⓢ	XTN2+4B	Screw,⊕2×4	
N18		SFPEV00502	Screw,Cartridge	1
N19	Ⓢ	XTN26+6BFZ	Screw,⊕2.6×6	1
N20	Ⓢ	XSN2+4	Screw,⊕2×4	1
N21	Ⓢ	XWA2B	Washer, ϕ2	1
N22		XTN3+5J	Screw,⊕3×5	3
N23	Ⓢ	XTV3+10BFN	Screw,⊕3×10	11

Ref. No.	Part No.	Description	
ACCESSORIES			
A1 (EK)	SFNUD04G01	Instruction Book	1
A1 (XL,XA XM)	SFNUD04X01	Instruction Book	1
A1 (EG)	SFNUD04R01	Instruction Book	1
A1 (EF)	SFNUD04F01	Instruction Book	1
A1 (EI)	SFNUD04I01	Instruction Book	1
A1 (PA,PE PC)	SFNUD04P01	Instruction Book	1
A1 (Other Areas)	SFNUD04S01	Instruction Book	1
A2	SFDHC05N01	Phono Output Cord	1
A3	SFDLC05N01	Ground Wire	1
A4 (EK) ⚠	SFDAC05G02	A.C.Cord	1
A4 (XL) ⚠	SFDAC05L01	A.C.Cord	1
A4 (XA,XM) ⚠	SFDAC05X02	A.C.Cord	1
A4 (PA,PE PC) ⚠	SFDAC05N01	A.C.Cord	1
A4 (Other Areas) ⚠	SFDAC05E02	A.C.Cord	1
A5 (XA,XM) Only ⚠	SFDKI19118	2Pin Plug	1
A6 (PA,PE, PC) Only ⚠	QJP0603S	Adaptor	1
PACKING PARTS			
P1 (EF) ○	SFHPD04C01	Carton Box	1
P1 (EF) Ⓚ	SFHPD04C21	Carton Box	1
P1 (Other Areas) ○	SFHPD04M01	Carton Box	1
P1 (Other Areas) Ⓚ	SFHPD04M21	Carton Box	1
P2	SFHHC02N01	Pad,Front	1
P3	SFHHC02N02	Pad,Rear	1
P4	SFHDC06S01	Sheet,Dust Cover	1
P5	SFHKD04N01	Clamper,Turntable Platter	3
P6	SFHKC02N01	Clamper,Tonearm	1
P7	SFHSC06N01	Spacer,Dust Cover	1
P8	SFYH45×50	Polyethylene Bag, Cabinet	1
P9	SFYH17×16	Polyethylene Bag, Accessories	1
P10	SFYF32B35	Polyethylene Bag, Turntable Mat	1
P11	SFHDD04N01	Pad,Turntable Mat	1
P12	SFHZN25N02	Sheet,Tonearm	1

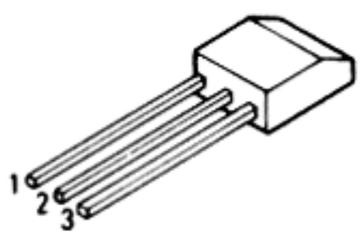
Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1	SVIUPC7812H	Regulator
IC2	DN6838-S	Hall IC
IC101	AN6637	Turntable Drive
IC201	AN6683	Turntable Control
IC301	MN1402FPG	Micro Computer
IC401	AN6554	Operation Amplifier
TRANSISTORS		
Q1	2SD638	Regulator
Q301	2SB641	Start Drive
Q302,303	2SD636	Switching Cueing Control
Q304	2SD892	Cueing Control
Q305	2SB641	Switching
Q306	2SD636	Offset Angle Detection
Q401,402 Ⓢ	2SD973S	Arm Motor Control
Q403,404	2SD1153	Arm Motor Control
DIODES		
D1 ⚠Ⓢ	SVDS1RBA20Z	Rectifier
D2	MA1056	5.6V Zener
D3	SVDPR5751F2	L.E.D,On/Off
D301	MA1075	7.5V Zener
D302	LN81CPH	L.E.D,Repeat
D303 Ⓢ	MA162A	Switching
D501 Ⓢ	MA162A	Switching
SWITCHES		
S1 ⚠	SFDSC02N02	On/Off
S301~304	EVQQSH03B	Start,Stop, Cueing,Repeat
S305	SFDSC02N01	Record Detection
S306,307	SFDSD04N01	Speed Selector Record Size Selector
S601	SFDSC02N03	Rest Position Detection
S901 (EK,XA,XM, PA,PE,PC Only) ⚠	SFDSHXW225-2	Voltage Selector
HALL ELEMENT		
H101,102	OH-002	Turntable Position Detection
CRYSTAL		
X201	SVQSH41TR	4.193MHz
POWER TRANSFORMER		
T1 (EK,XA,XM, PA,PE,PC) ⚠	SLT57DT1E	Power Source
T1 (XL) ⚠	SLT48DTE16F	Power Source
T1 (Other Areas) ⚠	SLT48DT3E	Power Source
VARIABLE RESISTORS		
VR301	EVN61AA00B54	Clock Frequency 50kΩ(B)
VR501 Ⓢ	EVNM0AA00B53	Servo Gain 5kΩ(B)
PHOTO INTERRUPTER		
PC501	ON1186	Offset Angle Detection
FUSES		
F1 ⚠	XBA2C05T1B	T500mA,250V
F2 (XA,XM,EK PA,PE,PC Only) ⚠	XBA2C02T1B	T200mA,250V

• Terminal guide of IC's, transistors and photo interrupter

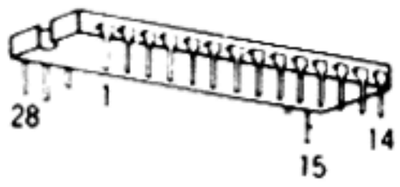
AN7812



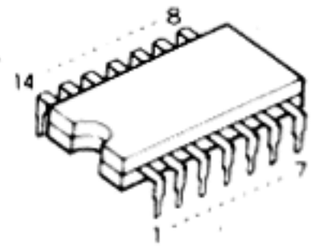
DN6838



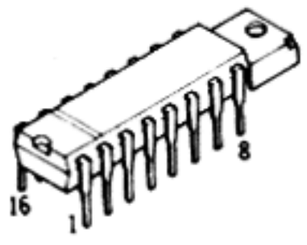
MN1402FPG



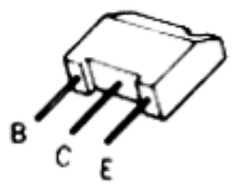
AN6554



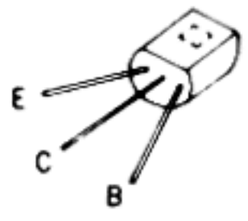
AN6637



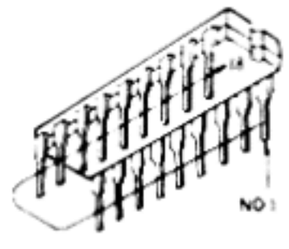
2SD638, 2SD636
2SB641, 2SD973



2SD892



AN6683



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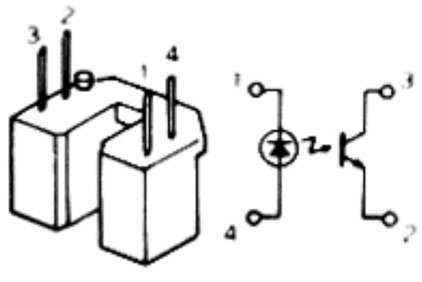


■ RESISTOR AND CAPACITORS

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. Unless otherwise specified. All resistors are in OHMS (Ω) K = 1000 , M = 1000k . All capacitors are in MICROFARADS (μF), P = 10^{-6} μF.

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value
ERG	1	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	J : ±5%
ERG : Metal Oxide	1 : 1W	G : ±2%

ERD2FCG□□□ ⟶ Fuse type carbon (1/4W)

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
ECKD	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA : Electrolytic	1A : 10V	1H : 50V DC	J : ±5%
ECEA...N : Non Polar Electrolytic	1C : 16V	2H : 500V DC	K : ±10%
ECKD : Ceramic	1E : 25V		Z : +80%, –20%
ECQM : Polyester	1V : 35V		P : +100%, –0%
ECEB : Electrolytic	1H : 50V		M : ±20%
ECCD : Ceramic	50 : 50V		

Ref. No.	Part No.	Value
RESISTORS		
RF1 ⚠	ERD2FCG180	18
RF2 ⚠	ERD2FCG330	33
R1 Ⓢ	ERD25FJ681	680
R2 Ⓢ	ERD25FJ221	220
R103	ERD10TLJ104	100K
R104	ERX1ANJ2R7	2.7
R105	ERD10TLJ270	27
R201	ERD10TLJ393	39K
R202	ERD10TLJ394	390K
R203	ERD10TLJ680	68
R204	ERD10TLJ151	150
R205	ERD10TLJ223	22K
R207	ERD10TLJ102	1K
R208	ERD10TLJ680	68
R301,302 Ⓢ	ERD25FJ272	2.7K
R303,304 Ⓢ	ERD25FJ272	2.7K
R305 Ⓢ	ERD25FJ272	2.7K

Ref. No.	Part No.	Value
R306 Ⓢ	ERD25FJ102	1K
R307,308 Ⓢ	ERD25FJ471	470
R309 Ⓢ	ERD25FJ272	2.7K
R310 Ⓢ	ERD25FJ562	5.6K
R311 Ⓢ	ERD25FJ102	1K
R312 Ⓢ	ERD25TJ153	15K
R313 Ⓢ	ERD25FJ472	4.7K
R314 Ⓢ	ERD25FJ222	2.2K
R315 Ⓢ	ERD25FJ562	5.6K
R316 Ⓢ	ERD25TJ223	22K
R317 Ⓢ	ERD25FJ103	10K
R318 Ⓢ	ERD25FJ272	2.7K
R319 Ⓢ	ERD25FJ221	220
R320 Ⓢ	ERD25FJ272	2.7K
R321,322 Ⓢ	ERD25FJ331	330
R323 Ⓢ	ERD25FJ562	5.6K

Ref. No.	Part No.	Value
R324 Ⓢ	ERD25FJ272	2.7K
R325,326 Ⓢ	ERD25FJ472	4.7K
R327 Ⓢ	ERD25FJ272	2.7K
R401,402 Ⓢ	ERD25TJ683	68K
R403 Ⓢ	ERD25FJ472	4.7K
R404 Ⓢ	ERD25FJ122	1.2K
R405 Ⓢ	ERD25FJ152	1.5K
R406 Ⓢ	ERD25FJ102	1K
R407 Ⓢ	ERD25TJ224	220K
R408 Ⓢ	ERD25FJ152	1.5K
R409 Ⓢ	ERD25FJ102	1K
R410 Ⓢ	ERD25TJ224	220K
R411 Ⓢ	ERD25FJ272	2.7K
R412 Ⓢ	ERD25FJ681	680
R501 Ⓢ	ERD25FJ391	390
R502 Ⓢ	ERD25FJ681	680

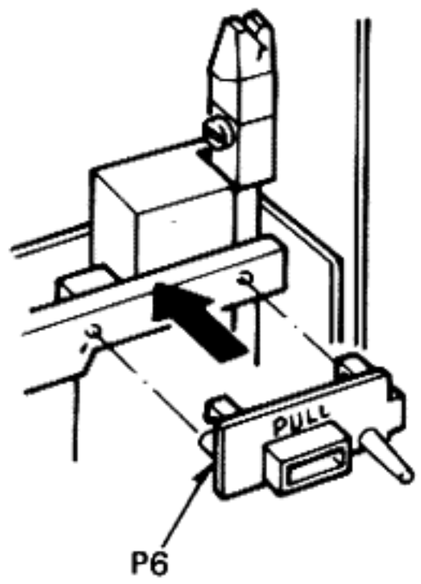
Ref. No.	Part No.	Value
CAPACITORS		
C1,2 ⚠	ECQM1223KZ	0.022
C3 ⚠	ECQM1223KZ	0.022
C4	ECEB1VU102	1000
C5 Ⓢ	ECEA1EU470	47
C101 Ⓢ	ECEA1CU330	33
C102 Ⓢ	ECEA50ZR22	0.22
C103	ECQV05274JZ	0.27
C105,106 Ⓢ⚠	ECEA1CN470S	47
C107 Ⓢ	ECEA50Z1	1
C201 Ⓢ	ECEA1AU470	47

Ref. No.	Part No.	Value
C202 Ⓢ	ECEA50ZR22	0.22
C203 Ⓢ	ECQM1H683KV	0.068
C204	ECUV1H121JCM	120P
C205	ECUV1H330JCM	33P
C206	ECUV1H101JCM	100P
C207 Ⓢ	ECEA1AU470	47
C208 Ⓢ	ECEA1AU470	47
C301 Ⓢ	ECCD1H680K	68P
C302	ECQM1H104KV	0.1
C303 Ⓢ	ECKD1H102KB	0.001

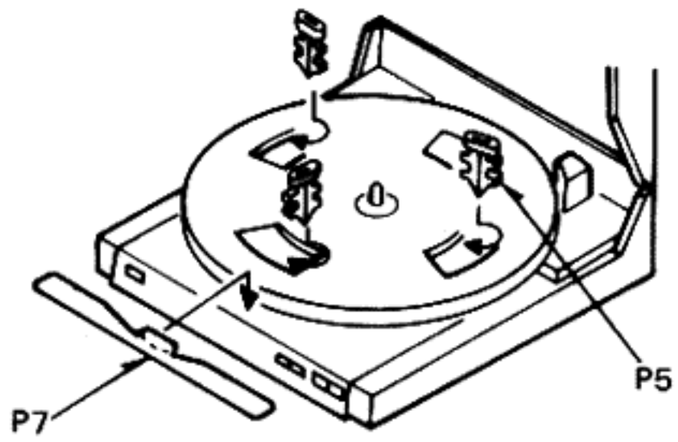
Ref. No.	Part No.	Value
C304 Ⓢ	ECEA1AU470	47
C305 Ⓢ	ECEA1HU3R3	3.3
C306	ECFR1H104ZF	0.1
C307 Ⓢ	ECKD1H102KB	0.001
C308,309	ECFR1H104ZF	0.1
C401,402 Ⓢ	ECQM1H223JZ	0.022
C601	ECFB1B104ZM	0.1

■ PACKING

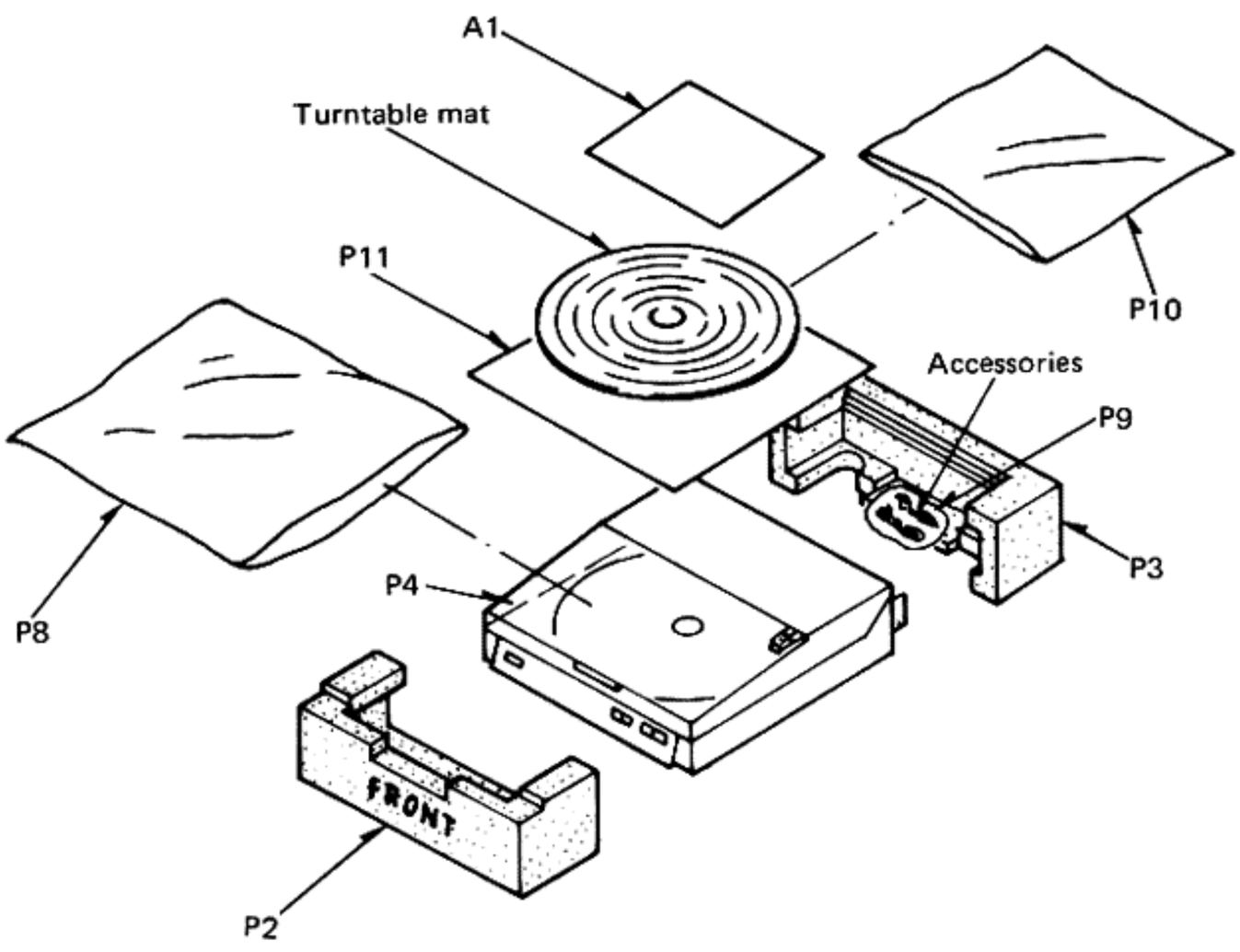
1. Open the upper cabinet and fit the spacer in place.



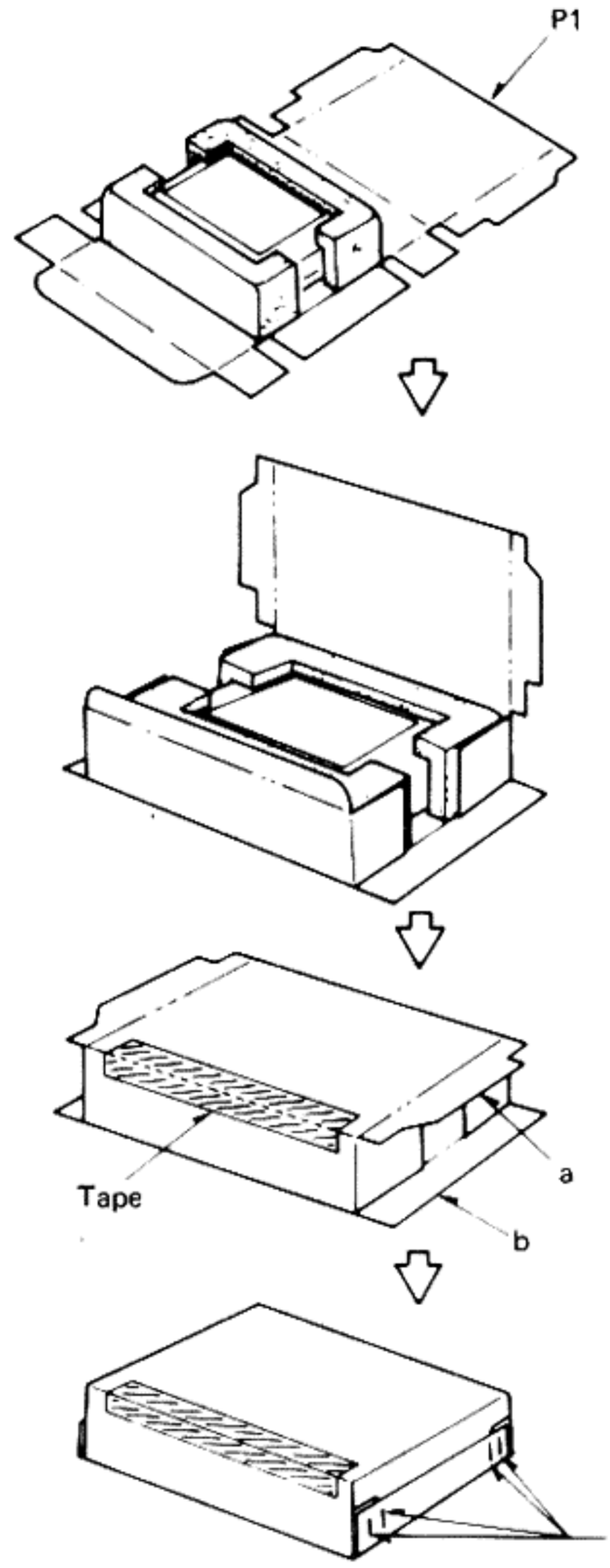
2. Fit the turntable platter clamper and dust cover spacer in place.



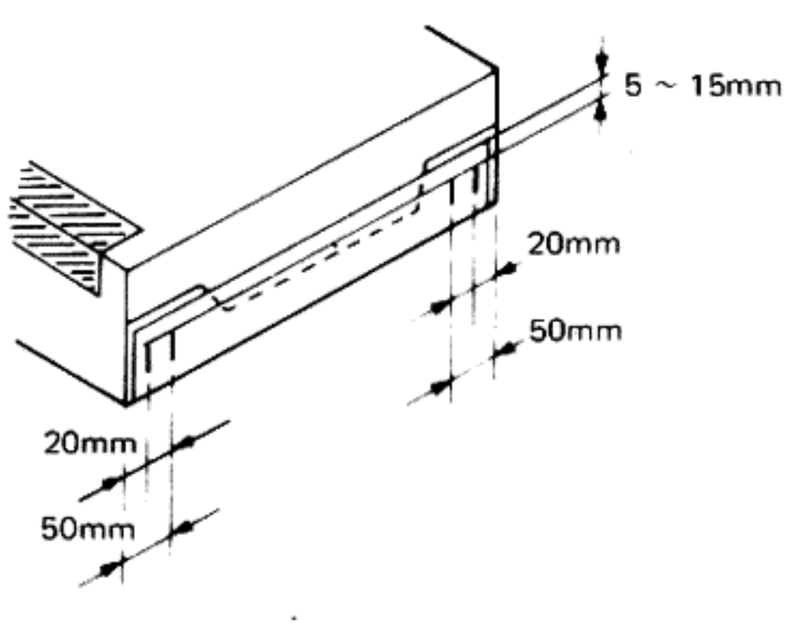
3. Put the set into polyethylene bag, and make the package as shown below.



4. Place the unit (with cushions attached) as illustrated.
5. Fold the flaps according to the line marks.
6. Seal the top with adhesive tape.
   * Use gum tape of adhesive cloth tape of 50 mm wide at least.
7. For the edges, first fold the flap "a" and then flap "b", and staple. Remember to staple only flap "b".
   (Use 15 or 16 mm staple)



*Stapling positions are shown below.



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